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# WISCONSIN

1926
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Wis.

# Farmers' Institutes

## 1889.

## BULLETIN No. 3.

EDITED BY

W. H. MORRISON, Superintendent.

MADISON, WISCONSIN.
1889.

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. . . . . MADISON, WIS.

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# PREFACE.

The farmer is the object of a great deal of solicitude in this day and age. A great many men have a message for him. He is made the subject of a great deal of gratuitous advice. If he fails to benefit by this advice or grow quickly to the full measure of his stature as a producer of food, and a citizen, it certainly will not be for a lack of self-sacrifice on the part of society in his behalf.

The foregoing is not written in a spirit of sarcasm, although much that is said and done for the farmer needs to be satirized, for the farmer himself is being farmed by interested parties. The fact remains, however, that there never was a day of greater activity among the forces of society for the enlightenment of the farmer than the present day.

The very first difficulty that is confronted is the greatest of all. It is the question, "How shall the farmer be reached?" We do not mean the intelligent, progressive farmer. He reaches himself and does not depend on others to think for him. He constantly seeks food for better thought and judgment by virtue of his own force. He is constantly in the knowledge market ready to buy what he wants.

It is the average farmer that society is after just now. Of necessity he stays at home most of the time. Of necessity he works hard early and late. He thinks he has no time to look about and see if there is not a better and more profitable way of doing his daily work. The work is there right on top of him every day, and so he does the best he can and toils along in the same old way, working hard and getting little pay for his labor. It is the general conviction of these facts that has caused such a quickening in society in his behalf.

Now this average farmer must be reached in some way. How shall it be done? He is the mountain. He cannot go to Mahomet. How shall Mahomet get to him?

The great object is to reach him and create in him a hunger for more and better knowledge. Two great facts confront this average farmer and silently, like the forces of light and heat, they have been making his kind of farming more and more difficult.

First, under the natural law of competition, his products have been gradually growing cheaper while he has taken but little pains to keep pace with this decrease in price by studying how to reduce the cost of production. With him it is less and less money each succeeding year, and still the same expense for production.

Right here step in a lot of advisers who tell him that the cause of all this lies in railroad extortions, or the tariff, or trusts, or monopolies. Scarcely one will tell him that the reason of the fact lies in himself. It is so easy for the unsuccessful man to cast the blame upon everything except himself. He has not kept place with the world; he has been jogging along in old ways and methods until

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old ways and methods will no longer produce a pound of grain, or butter, or cheese or meat or wool, cheap enough to meet the price and leave any profit. This average farmer is a manufacturer of food, and he must wake up and use a manufacturer's brains, and close economies in production, or he will be worse pinched in the future. There is no hope for old methods. The world is bound to have cheap food, and the world is right. The success of the brainy, progressive farmer in producing it and that, too, at a profit, shows it can be done.

The second great fact that is troubling this average farmer is the loss of fertility in the land he tills. Here is the upper and nether mill-stone between which he is being ground: *Less price and less productive power in his land.*

No wonder he squirms. No wonder he looks eagerly from Doctor Anti-monopoly to Doctor Anti-trust or Doctor Free Trade, and asks: "Have you no remedy for my deep distress?" Plain old Doctor Common-sense tells him he must stop this ruinous way of doing things; that he alone is to blame for the situation and not outsiders. He tells him that the land is poor because he has made it so, and not the railroads or the tariff. He tells him that it takes more brains to make a profit at any kind of farming than it did in times of high prices and more productive soil, and that he must adapt himself to the changed order of things. *All* this he tells him, or would tell him if he could only get his ear and attention. Therefore, how shall this farmer be reached? is the important question of the hour.

We believe that the most practical and successful method of reaching him is through Farmers' Institutes, and meetings of like character. The two hundred and forty two days' meetings held by the Wisconsin Farmers' Institutes, have done more to reach the great mass of unreached farmers in this State, in the past four years, than all other agencies of society combined. These meetings have implanted a hunger for better intelligence in thousands, where it but feebly existed before. A wonderful amount of daylight has been let into dark places. The conceit of ignorance has been driven out and the dry rot of stupid indifference banished to an extent that is wonderfully encouraging. The agricultural journal, the agricultural book, the agricultural college and the experiment station are for the men who read, study and think. Let the Farmers' Institutes have their perfect work first and these will follow. In this way shall the average farmer be reached.

# LETTER OF TRANSMITTAL.

HON. GEO. H. PAUL,

*President of Board of Regents, University of Wisconsin:*

I have the honor of presenting to you Bulletin No. 3, Wisconsin Farmers' Institutes. An edition of 31,000 copies has been issued and will be distributed to the farmers of the State free.

Early in September I addressed a circular letter to many of the leading men of Wisconsin, and to a few of the most prominent agricultural thinkers who have assisted at some of our institutes, the following questions:

Have the Farmers' Institutes been of any benefit to the farmers of your county? Have they aroused a spirit of inquiry for better work, and for more systematic effort? Has your observation led you to note that the most intelligent and successful farmers attend and take part in these Institutes, and invariably have faith in their business? Do you think they have a tendency to advertise and popularize our State University? Have they given our State a prominence abroad?

I append the following letters.

W. H. MORRISON,
*Superintendent.*

*Madison, Wis., Nov.* 1, 1889.

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MR. W. H. MORRISON — "Judging from the list of your institutes for 1889–90, there seems to be no abatement of effort on the part of those who have made the Wisconsin Farmers' Institutes not only the pride of the State, but factors of active power for the betterment of the condition of the farmers throughout the whole continent. I came back from the Wisconsin Institutes to Canada with a new inspiration for endeavor on behalf of our farmers here, and also with an increased store of information for their benefit.

"The published annual report of your Institute work is the best compendium of crisp, living thought on practical agriculture that has come into my hands, and through the medium of the agricultural press, its contents are touching the reading farmers in all English speaking countries. Largely through the agency and aid of Farmers' Institutes, agriculture is beginning more fully to offer scope for the exercise of the powers of the most ambitious and talented young men in all highly civilized lands. You are engaged in a truly good and ennobling work. I wish you God speed."

JAS. W. ROBERTSON.

*Ontario Agricultural College, Guelph, Ont., September* 23.

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MR. W. H. MORRISON — "To all the above questions I unhestatingly and most emphatically answer, yes.

"The design of the Institutes was to awaken an interest in farming, and to impart practical knowledge in its various branches. And in both of these directions the success has been greater than their most sanguine supporters dared to

hope. It was supposed that after they had ceased to be a novelty the interest in them would decline, but from personal observation I think the attendance during the last winter was uniformly larger, and the interest better sustained through the entire session than when first started.

"As to the State University, only a few years ago a feeling of antagonism was almost universal among the farmers; but the attendance of Professors Henry and Babcock, and their teachings, together with the work of the Experiment Station, has produced a marked change; and to-day the State University of Wisconsin may reckon among its staunchest friends the better class of farmers through the entire State.

"The almost universal sentiment is, I believe, that in no other way could so small an amount of money have been used with such good results as that expended in Farmers' Institute work; and all are looking forward to the meetings of the coming winter with increased interest."

CHARLES R. BEACH.

*Whitewater, Wis., Oct. 4.*

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MR. W. H. MORRISON—"While it is true that I did not have the opportunity of visiting your State the past year of Institute work on account of other engagements, I have remembered with pleasure my brief experience during the course of the work for 1887–88. I have thought it over and over again with increasing favor. The work is so practical and, withal, covers so much ground, that I do not wonder at all that halls were crowded, in many places almost to suffocation. If the farmers of your State fully understood the character of the work being done in the holding of your Institutes, they would have to be multiplied a hundred-fold to accommodate the attendance. No farmer, fruit grower or the breeder of any kind of live stock, can afford to neglect attending your Institutes. They have an uplifting influence that will be developed more and more as the work progresses. They are in fact so many schools in which the experience of the life time, almost, of practical men is handed out without money and without price, to aid those in attendance in achieving better success in life.

"I sincerely wish that your work for the season, just beginning, may be marked for the increasing interest attending it, and I shall expect to hear from time to time a good report from the leading State in the Farmers' Institute work."

J. J. W. BILLINGSLEY.

*Indianapolis, Ind., Sept. 19.*

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MR. W. H. MORRISON—"I have often had occasion to tell the story of that farmer, out in Buffalo County I think it was, in your State, who came to the Institute on horse-back and became so much interested that he walked home, two miles, and never once thought of his horse until he missed him from his stable, when doing his chores. If the Institute did not help that man, I am no judge. If there were not thousands of others stirred up and helped, I am greatly mistaken.

"I consider your Institutes models, as conducted, and would that every State could be roused up to do as well."

T. B. TERRY.

*Hudson, O., Sept. 16.*

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MR. W. H. MORRISON—"I have, as you know, followed the Farmers' Institute work with special interest and attention, not only in Wisconsin, but in sev-

eral other States. To say that I regard the work of this particular feature of our intellectual progress as the most important now going on in our midst, and that nowhere is it more energetically and more practically carried on than in Wisconsin, is simply to re-iterate what I have often said before in the agricultural journals with which I have been connected. Lest the first statement, so briefly and strongly put, should seem to some who have not given the subject the attention it deserves, to be exaggerated, I would add an expression of my conviction that without the Institute work, the Agricultural Colleges and Experiment Stations would never reach the people they are designed to serve; the intellectual development of the farmer and the practical application of science to agriculture would thus be arrested. Now, in considering this fact, let it be borne in mind, that the farmer class represent nearly one-half the active workers in our great American hive, and, probably, in view of their larger families, more than one-half the population, and that the prosperity of all other industries is contingent on theirs, and I think my estimate of the importance of Institute work will no longer appear exaggerated.

"It gives me great pleasure to congratulate you upon the gratifying progress going on steadily from year to year in the work under your charge — work which must greatly inure to the greatness and prosperity of your beautiful State."

GEO. WM. HILL.

*U. S. Department of Agriculture, Washington, D. C., Sept.* 16.

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MR. W. H. MORRISON — "We are pleased to receive notice that the farmers of Juneau County are to be favored with one of your valued Institutes, the coming winter.

"It is indeed astonishing to note the change in methods and system among our farmers, during the past three years. Since these Institutes have come among us, people who worked in the pinery winters, and regarded their farms as a place to while away their time summers, until the snows again fell, have suddenly realized that the farm can be made a comfort and a home, and that, by proper attention and management, it could be made to pay handsome returns. They have suddenly acquired an interest and liking for the business, and are pushing into improved stock, dairying, small fruits, bees, etc. The result is that their farms are working right up in fertility, and are yielding crops of all kinds, which a few short years ago were not dreamed of. The farmers themselves are getting out of debt, and are on the road to independence and affluence. We credit the Institutes with sowing the seed and pointing out the way to this result. As you must remember the universal attendance of our people at the Institutes each year, and the interest with which they grasp each idea and suggestion advanced, you will not be surprised when I tell you that they did not stop there content with the Institute work alone, but organized farmers' clubs and held regular meetings, and kept right on reaching after knowledge and comparing notes and ideas, with the result as stated.

"It is indeed the best work the State University ever did, and the best paying investment the State ever made, so far as this community is concerned, and we notice with pride the exalted position the State is taking as an agricultural people abroad, since this work has been in progress. Long live the Farmers' Institutes."

W. H. H. CASH.

*New Lisbon, Wis., September* 20.

MR. W. H. MORRISON — "As far as I can judge, the Farmers' Institutes have been of great benefit to the farmers in this vicinity. We had a good attendance at the one held here two years ago, and all the best farmers in the immediate neighborhood were there. I also noticed thereafter, in our Grange, a continuance of discussion of ideas advanced there.

"This State has an undoubted lead in Institute work, and Mr. Charles Dudley Warner's article in Harper's Magazine, has given the subject notoriety throughout the whole country.

"I have received letters from my old home in New Hampshire, asking about them, and I reply that it is the best thing we have; that it increases our knowledge, our crops, and the the general intelligence and welfare of our people, and elevates the whole tone of thought of the farmers who attend."

MRS. J. A. CLARK.

*Waterloo, Wis., Sept.* 23.

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MR. W. H. MORRISON — "I have no hesitation in saying that, in my judgment, Farmers' Institutes as conducted by you in Wisconsin, are of more moment and fraught with more benefit to the farmers than any other educational system that could possibly be adopted. These Institutes have already been the means of advancing Wisconsin to the front of all her sister States in progressive agriculture. It is fortunate that you have such men as ex-Governor Rusk and Governor Hoard to lend helping hands in the noble work."

JOHN H. STEVENS.

*Minneapolis, Minn., Sept.* 16.

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MR. W. H. MORRISON — "I desire to bear testimony to the remarkable success that has attended the Farmers' Institutes held in this vicinity.

"The plan of calling forth the experience and wisdom of the farmers in each locality has added greatly to the profit and interest of these meetings, and so great has been the enthusiasm that the size of the gatherings has been limited only by the capacity of the audience rooms.

"The best feature of the Institutes is their power to produce practical results, and I believe that the first series of Institutes led to more improvements in dairy methods, to the purchase of more blooded stock, to the building of more silos, and, in short, accomplished more good than could have been achieved by any other agency.

"The farmers have responded with an enthusiasm and ability for which I had not given them credit. It reminds me of the days of the civil war when the common people rose so grandly to meet the needs of the nation. If we continue to build on this broad and solid foundation of facts and experience, and make the Farmers' Institute a part of our national life, we shall elevate American farming to its rightful place, as the highest and noblest of all the sciences."

F. B. NORTON.

*Burlington, Wis., Oct.* 2.

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Mr. W. H. MORRISON — "I deem it a privilege to be able to add my testimony to the expressed opinions of others, regarding the value of the Farmers' Institutes as a bettering influence throughout this State. My experience in Institute work in this county has been inconsiderable, but in the counties of Trempealeau, and

La Crosse, for the past four years, I have taken an active interest in the work, and it has been demonstrated to me beyond the possibility of a doubt that the Farmers' Institutes conducted by yourself in this State, have exerted a wonderful power for good. The knowledge they have diffused has been a revelation to even the best and wisest farmers of the State. They have given to farmers a new interest and life in their work, and have done much to encourage and exalt the business of agriculture, conserve fertility, improve our live stock, produce and increase better farm products, infuse system and business principles into farming, and at the same time develop a citizenship of thought and intelligence, of ownership of land and home, than all the other forces and influences combined, which have had in any way to do with our agricultural prosperity. In short the Farmers' Institutes have caused two blades of grass to grow where but one grew before; they have vastly increased the productive qualities of every cow and every acre of land in the State; they have enlightened and made contented the farmers in my opinion, and brought dignity and profit to the profession.

"Five years ago there was not a successful creamery or cheese factory in Trempealeau County. To-day there are seven successful factories of this kind, and the dairy production of the county has been more than doubled. I believe the channels of usefulness for the Farmer's Institutes in this State are numerous and important, and that they should be encouraged and fostered, to the end that their usefulness and value may be increased."

F. F. MORGAN.

*Cumberland, Wis., Sept.* 26.

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Mr. W. H. MORRISON — "For two years we have watched the work of the Institutes as carried on in your State; first by a study of the papers presented at them and the discussions that followed, as they appeared in agricultural journals, then by mingling with your farmers at agricultural, horticultural and stock meetings, and lastly by attendance at an Institute. By the first we were impressed with the vast amount of valuable information brought out. By the second we noticed the broad views and high aspirations of your agriculturists, obtained through the Institutes. By the third we were more than ever thoroughly convinced that there is nothing that tells upon men so much as personal experience. The man who can say, "I have done it," is the man whose words tell. What the farmer of to-day wants is experience, not theory, and that is what the Wisconsin Institutes, more than those of any other State, give its farmers. It is my earnest wish that the coming winter may add new success to that already attained by the Institutes of Wisconsin — the pioneer in this grand work."

W. B. LLOYD,
*Associate Editor Farm, Field and Stockman.*

*Chicago, Ill., Sept.* 17.

# LAW PROVIDING FOR AGRICULTURAL INSTITUTES.

*The people of the State of Wisconsin, represented in senate and assembly, do enact as follows:*

SECTION 1. Section 1, chapter 9, laws of 1885, is hereby amended, by omitting from said section the words, "in the months of November, December, January, February, March and April in each year," where they occur in the fifth, sixth and seventh lines thereof, so that said section, when so amended, shall read as follows: Section 1. The Board of Regents, of the State University, is hereby authorized to hold institutes for the instruction of citizens of this State in the various branches of agriculture. Such institutes shall be held at such times, and at such places as said board may direct. The said board shall make such rules and regulations as it may deem proper for organizing and conducting such institutes, and may employ an agent or agents to perform such work in connection therewith, as they deem best. The course of instruction at such institutes, shall be so arranged as to present to those in attendance, the results of the most recent investigations in theoretical and practical agriculture.

SECTION 2. Section 2, chapter 9, laws of 1885, is hereby amended, by striking out the words, "five thousand dollars," where they occur in the fourth line of said section, and inserting in lieu thereof the words, "twelve thousand dollars," so that said section, when so amended, shall read as follows: Section 2. For the purposes mentioned in the preceding section, the said board may use such sum as it may deem proper, not exceeding the sum of twelve thousand dollars in any one year, from the general fund, and such amount is hereby annually appropriated for that purpose.

SECTION 3. This act shall take effect and be in force, from and after its passage and publication.

Approved March 16, 1887.

# SHORT COURSE IN AGRICULTURE.

The University of Wisconsin has provided a special course in Agriculture, to accommodate those young men who desire to gain a better knowledge of the science underlying successful agriculture but who can give only a limited time to such preparation. For the accommodation of such students the term opens January 6, 1890, and lasts twelve weeks.

The facilities now provided to make this an intensely practical and profitable course for young farmers are greatly superior to those offered in previous years.

A reading room and library have been provided in which students will find the standard works on agriculture and files of seventy of the leading agricultural periodicals, nine of which are from Europe. The lecture room is provided with an electric light so that lantern slides illustrating the lectures may be used.

The famous *Auzoux* life size model of the horse, which can be dissected to show the separate muscles, nerves, blood vessels and bones, will be used to illustrate the lectures on anatomy.

A new feature, added this year, and one of great practical importance is

A COURSE IN PRACTICAL DAIRYING,

under the supervision of Dr. Babcock and Mr. E. M. O'Connell. This will consist of practical work in the new dairy house, combined with lectures and laboratory work.

Mr. O'Connell has studied with Prof. Robertson, of Canada, and during the past season has been giving instruction in dairying to the cheese makers of Sheboygan County, under the auspices of the State Dairymen's Association; Hiram Smith regards him one of the best practical cheese makers in the State.

Through an increase in the corps of instructors and more ample accommodations than heretofore, it has been found possible to so expand the course as to offer the student work ample for two terms, from which he may elect such subjects as, in his judgment, may seem best for the time, and still have fresh work to which he may return another year should he so desire.

The course embraces the following:

Sixty lectures, mainly devoted to the feeding and breeding of live stock, by Prof. W. A. Henry.

Sixty lectures on the elements of agricultural chemistry, by Dr. S. M. Babcock.

Sixty lectures on horticulture and economic entomology, with laboratory work, by Prof. E. S. Goff, embracing propagation, planting, cultivation, pruning, marketing, harvesting and preserving fruits; the growing of vegetables; the formation and care of hot beds; the culture of flowers; the principles of land-

scape gardening; how to grow, cure and preserve seeds; the principles of selection and the art of cross-fertilization; also the classification of insects, the principal injurious and beneficial insects, with means of preventing insect ravages.

Forty lectures on the leading principles underlying the cultivation of soil drainage, farm machinery, fences, etc., accompanied by laboratory exercises; together with twenty lectures on the physical features of the climate, and meteorology of Wisconsin and the United States, by Prof. F. H. King.

A course in shop-practice involving the use of wood-working tools and the forging of iron, by Supt. C. I. King.

Thirty-six lectures on the anatomy of domestic animals, by Dr. V. T. Atkinson, State Veterinarian.

The expenses of the term need not exceed $70.00 for fees, books, board, room and washing.

This course opens January 6, 1890, and lasts twelve weeks.

No examinations will be required, but applicants must be not less than sixteen years of age and have a common school education.

For further particulars, address PROF. F. H. KING,
*Madison, Wis.*

# UNIVERSITY OF WISCONSIN.

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# Wisconsin Farmers' Institutes--1889-'90.

| *Town or Cities.* | *Counties.* | *Dates.* |
|---|---|---|
| Seymour | Outagamie | Nov. 19,20 |
| Colby | Clark | Nov. 19,20 |
| Medford | Taylor | Nov. 21,22 |
| Waupaca | Waupaca | Nov. 21,22 |
| Osceola Mills | Polk | Nov. 26,27 |
| Chetek | Barron | Nov. 26,27 |
| Cumberland | Barron | Nov. 29,30 |
| Bloomer | Chippewa | Nov. 29,30 |
| New Richmond | St. Croix | Dec. 2, 3 |
| River Falls | Pierce | Dec. 2, 3 |
| Menomonie | Dunn | Dec. 4, 5 |
| Hammond | St. Croix | Dec. 4, 5 |
| Durand | Pepin | Dec. 6, 7 |
| Wilson | St. Croix | Dec. 6, 7 |
| Shawano | Shawano | Dec. 10,11 |
| Wausau | Marathon | Dec. 10,11 |
| Hortonville | Outagamie | Dec. 12,13 |
| Grand Rapids | Wood | Dec. 12,13 |
| Ono | Pierce | Dec. 17,18 |
| La Crosse | La Crosse | Dec. 17,18 |
| Fountain City | Buffalo | Dec. 19,20 |
| De Sota | Vernon | Dec. 19,20 |
| Baraboo | Sauk | Dec. 23,24 |
| Portage | Columbia | Dec. 23,24 |
| Lone Rock | Richland | Jan. 2, 3 |
| Stoughton | Dane | Jan. 2, 3 |
| Mondovi | Buffalo | Jan. 7, 8 |
| Whitehall | Trempealeau | Jan. 7, 8 |
| Augusta | Eau Claire | Jan. 9,10 |
| Neillsville | Clark | Jan. 9,10 |
| Black River Falls | Jackson | Jan. 14,15 |
| Viroqua | Vernon | Jan. 14,15 |
| New Lisbon | Juneau | Jan. 16,17 |
| Tomah | Monroe | Jan. 16, 17 |
| Montello | Marquette | Jan. 21, 22 |
| Friendship | Adams | Jan. 21, 22 |
| Plainfield | Waushara | Jan. 23, 24 |
| Westfield | Marquette | Jan. 23, 24 |
| Amherst | Portage | Jan. 28, 29 |
| Winneconne | Winnebago | Jan. 28, 29 |
| Fond du Lac | Fond du Lac | Jan. 30, 31 |
| Dartford | Green Lake | Jan. 30, 31 |
| Shullsburg | La Fayette | Feb. 18, 19 |
| Elkhorn | Walworth | Feb. 18, 19 |
| Brodhead | Green | Feb. 20, 21 |
| Union Grove | Racine | Feb. 20, 21 |
| Jefferson | Jefferson | Feb. 25, 26 |
| Kenosha | Kenosha | Feb. 25, 26 |
| Janesville | Rock | Feb. 27, 28 |
| Waukesha | Waukesha | Feb. 27, 28 |
| Green Bay | Brown | Mar. 4, 5 |
| Manitowoc | Manitowoc | Mar. 4, 5 |
| Waldo | Sheboygan | Mar. 6, 7 |
| Brillion | Calumet | Mar. 6, 7 |
| Hartford | Washington | Mar. 11,12 |
| Randolph | Dodge | Mar. 11,12 |
| Cedarburg | Ozaukee | Mar. 13,14 |
| Juneau | Dodge | Mar. 13,14 |
| Belleville | Dane | Mar. 18,19 |
| Dodgeville | Iowa | Mar. 18,19 |
| Waterloo | Jefferson | Mar. 20,21 |
| Whitewater | Walworth | Mar. 20,21 |
| Platteville | Grant | Mar. 25,27 |

# Closing Farmers' Institute—1889

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**Waukesha, Wis., March 26-28.**

# SMALL FRUITS ON THE FARM.

By C. H. HAMILTON, Ripon, Wis.

**Start a Fruit Garden.**—Set apart a good, liberal piece of ground from your farm for a fruit garden, and give it good protection, by putting a fence around it so that there will be no danger of pigs getting in and despoiling your labor. Fruit on the farm is a subject of great importance—one which the average farmer does not pay the attention to he ought, and he will never know how mean a man he has been to his wife and family until he comes to have the supply of fruits which he may have by a very small outlay of expense and labor. From the middle of June to the first of October he may have for his table fresh fruits picked from the vines, and plenty to put up in cans to use until the fruit season comes again.

**Preparing the Ground — Planting.**—Prepare the ground well, by applying a liberal supply of barn-yard manure. Plow and harrow it thoroughly, until all the lumps are pulverized, for labor bestowed on the land before plowing can be done with greater ease than after. What shall we plant to secure a grand succession of fruits, from early summer until fall? Strawberries, raspberries, red and black, blackberries, currants, gooseberries and grapes.

**Strawberries.** — For strawberries don't undertake to set all you may read about in the different catalogues. Let the prosperous fruit-growers experiment with the newer and expensive varieties, and you may learn from them which are best for you. Quality of soil has a great deal to do with the success of many varieties. What may do well and thrive on one kind of soil may be entirely worthless in another section where there is different soil. The Wilson, Cresent, Captain Jack, Manchester, and many of the old and tried sorts will give you an ample supply of delicious fruits, if well taken care of.

Plant your strawberries, as well as other fruits, in rows so that they may be cultivated with the help of horse and cultivator. Plant in rows, 3½ to 4 feet between the rows, and the plants 1½ to 2 feet in the rows.

Frequent and thorough cultivation will pay you, and when cold weather comes on, cover them with some coarse marsh hay, or cornstalks. Remove the same early in the spring.

I think the surest way to have a good crop of fruit every year is to set a new bed each spring. Be careful in the selection of your varieties to get staminate kinds to set along with your pistillate varieties. For example, in setting the Cresent, which is a pistillate, set the Wilson. Some are of the opinion that the expression, "Give them Jessie" was well carried out in the poor success they had with this variety. I have yet to hear of satisfactory results on sandy soil, while with me, on my prairie soil, it has proved quite satisfactory, yielding large, fine, luscious berries.

**Raspberries.**—Plant raspberries in rows, not nearer than 6 feet between rows and 2 feet in the row. Give them good cultivation, and attend to cutting back the new growth so as to make a

low stocky bush, with fine, strong branches. The red raspberries are, as a class, great to sprout, and you need to keep them in rows, generally in a continuous row; but be sure to keep a right-of-way between the rows, so you can cultivate.

**Blackberries.**—Blackberries should also be planted in hills 3 feet apart in the row, and the rows 7 feet apart. Give them good care, the same as all your other fruit; endeavor to keep them in hills. Pinch them back, and don't let the main stalks grow over 2½ to 3 feet in height; support them by wire on each side and stakes every 20 feet; lay them down in the fall, and cover them with earth.

**Currants.**—Currants can be as easily grown as potatoes. Set them in rows 6 feet apart and 3½ feet in rows; this will apply to the gooseberry also. Both are subject to the attack of the currant worm, which can be as easily exterminated as our potatoe bugs, by using Paris green in a weak solution, applied at their first appearance, which is generally about as the fruit first begins to form. After that white hellebore can be used with less danger. By watching for their appearance on the bushes and applying either of the above, you will exterminate them with very little labor.

**Grapes.**—Grapes are as easily cultivated, and about as sure a crop as most of the other fruits. They need good care in cultivating, and pruning or pinching back during their fruiting season. Check strong growth of wood, and see to it that the vines are not overloaded with fruit—more than the vine can probably carry through and ripen. In the fall a vigorous use of the knife is necessary for the good of the vine, in cutting away the most of the new growth, to within a few buds of the old cane, and in removing the old cane as fast as we can procure a young shoot from the crown or base of the plant.

I think the old idea of digging a large hole and filling up with old bones and even dead animals is a thing of the past. My theory is that land good enough to raise a crop of corn is good enough to plant your vines on. Plant them 8 feet apart; train them to a stake or wire trellis; lay them down on the ground and give them some covering—I think to cover with earth is the safest. Straw will answer, but I fear the mice will sooner or later rob me of one season's fruit by gnawing my plants. The varieties of grapes are many, but those for general cultivation are few.

There are many locations in our State well calculated for grape growing yet undeveloped. Plant some grapes. The Concord, a general favorite, Worden, Moore's Early, Lady, Delaware, Brighton, are hard to duplicate.

**Fruit as Food.**— The importance of fruit as an article of diet is at last beginning to be appreciated. The taste for fresh fruit is growing fast, and while many of our farmers know that they ought to supply it to their families, they still fight shy of planting and say they can buy what berries they want cheaper than they can grow them. Yet they do not. Farmers do not deceive yourselves. Why deny yourselves and families these delicious articles of food? Let us decide to plant them.

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**Discussion.**

MR. FLEMING.—How deep would you plant currants and gooseberry bushes?

MR. HAMILTON.—I should prefer to plant them not over six or eight inches deep. I would not advise the raspberry over an inch and a half under the soil. In planting any plant that has been removed, especially of the vine or tree sort, I generally calculate to plant about two

inches deeper than they were before; so as to allow for the settling of the earth around them.

MR. PEPPER.—What varieties of gooseberries do you recommend?

MR. HAMILTON.—The Downing with me has proved the best success, been free from mildew, and yielded a fine crop of berries. The Industry has always done amazingly well for a variety that has not originated in this country, but I find the summer's sun too hot for it, and I also find, by correspondence, that in the old country they are raised most successfully in the shade. I put a cover over my Industry gooseberries, and then I get the strong effects of the sun away from them. I put mosquito netting over them, just enough to break the rays of the sun.

QUESTION.—Have you had any experience with tree gooseberries that are talked about by agents?

MR. HAMILTON.—I never happened to strike one that was very much of a tree. I can manufacture a gooseberry bush that will answer the purpose for a year or two, but I would not guarantee it to remain in the tree shape very long.

MR. DYER.—I am very much troubled with the borer, and have not been able to raise any currants for several years.

MR. HAMILTON.—I have never had any serious trouble with them. I have never done anything more to guard against them than to give my plants good cultivation, and where I have had them attacked they have out-grown the effects of them.

MR. KELLOGG.—If the currant borer once enters the bush, it is very hard to get at. I think the knife and fire and poison are our only remedies.

SUP'T. MORRISON.—How much bush would you have left after all that?

MR. KELLOGG.—I would cut out the older wood and burn it, and leave the two-year-old. I might have to lose my crop of currants, and could afford to. I would poison them every two weeks, the first season. Of course the more you cultivate, the better crop you will have. The best two reds I know are the Fay and the Victoria, which are far better that the cherry.

MR. HAMILTON.—I think the borer will come to solid ground more than if the bushes are well cultivated.

MR. FAVILLE.—Can you tell us what kinds of fruit will thrive, with the attention that the ordinary farmer can give them?

MR. HAMILTON.—There is no use trying to get a good liberal supply of fruit without giving it care. The nearest that will come to it is my friend Kellogg's Crescent strawberry; that will fight for itself better than any strawberry that I know.

MR. FAVILLE.—Isn't it a fact that the average farmer can buy his fruit cheaper than he can raise it? I know you will all say he won't buy it, and very likely he will not, but isn't it a fact that he can devote his attention to his farm crops, and buy his fruit of a professional grower to better advantage, and cheaper?

MR. KELLOGG.—I have my doubts, that is if you take into consideration the enjoyment of going out and picking his own fruit. They say they haven't any time, but I notice that where a farmer goes into his own garden, and finds lucious fruit hanging there in bunches, he will pick and eat a good deal. I believe that where the average farmer will buy one case of fruit for his family, if he has the same fruit in his garden, they will eat six or eight times as much.

MR. LOUIS.—I think that Mr. Faville has rather overdrawn the picture. I think if you will give your boy a good

cultivator, and have your fruit in rows, and fix it so that he can spare half an hour when he comes out of the corn-field to work in the garden, we could have lots of fruit. My experience is this: If we have to buy fruit we will never have it. With us we can always get it.

SUP'T. MORRISON.—I would like to have some questions drawn out about blackberries. Mr. Hamilton has shipped them across the State and into Minnesota and made money out of them.

MR. MCCLURE.—What kind of blackberries would you recommend for the average farmer so that he can have hardy varieties?

MR. HAMILTON.—I have yet to find the plant that I consider perfectly hardy in all parts of the State. Stone's Hardy will stand some of our winters, but not more than one-half of them; neither will Snyder nor Briton. I do not consider it safe to try to go through the winter with any of them, without laying down. This last winter we have been all right, but you can never tell. It costs very little to lay down the few plants which a farmer has. I am sure $10 would cover the expense, and then you are sure that you are safe and have secured your crop. I consider the Ancient Briton, either for the farm or shipping purposes, the king of them all. The Snyder may be a little bit hardier. It has a little harder wood, something like the Duchess of Oldenburgh, and is a little harder to lay down and protect than the Briton.

SUP'T. MORRISON.—How many acres have you in blackberries?

MR. HAMILTON.—I have but eight acres at present. I think in the vicinity of Ripon there are not far from one hundred and twenty-five acres in cultivation, and I know no reason why they are doing better than in other localities where they get the same care.

MR. PEFFER.—We have had great trouble in our section, the last two seasons. Our fruit has burned up before it was ripe.

SUP'T. MORRISON.—Mr. Gale, do you raise any blackberries?

MR. GALE.—We raise some. We lay down and protect them the same as Mr. Hamilton. We find no variety that will stand without protection. The two last years we found the same trouble the gentleman last spoke of—they have been scalded in the vine, with the best cultivation.

MR. HAMILTON.—A year ago last summer the drouth with us was very severe. It was extremely hot, and the crop in general was a good deal of a failure. I used the "poor man's irrigator" (what they call the horse and cultivator in California), and used it thoroughly and steadily every day. My neighbors came to consult me about the crops drying up, and asked me why my crops looked better than theirs. I kept the cultivator going and carried my crops through, while some of my neighbors stood around on the corners of the street, in town, and told how dry it was, and how we were not going to have any corn or berries. Some of them stayed at home and stirred their ground and cultivated it, and they came out the best. While my neighbors had hundreds of bushels dry upon their vines, with my steady use of the poor man's irrigator, I carried the crop of hundreds of bushels through. I use mulching as much as I can; still I cannot say that if I mulched my vines I need not cultivate. I cultivate them just the same.

MR. THOM.—How can you cultivate when you mulch?

MR. HAMILTON.—The rows are seven feet apart, and we calculate four or four

and a half feet in there to keep stirring. There shall be a mulch of about one foot on each side, and then we have it fine and make a mulch out of the earth itself. You will find after cultivating, that there is a vast amount of moisture collected under this mulch that we have made out of the land, by breaking up the little capillary air cells. I cultivate shallow, a little deeper in the spring, and not over two and a half or three inches.

QUESTION.—Have you ever tried dewberries?

MR. HAMILTON.—I have tried a few hundred plants. The Lucretia did extremely well, and bore a very good crop of fine berries.

MR. DYER.—Tell us you method of operating; whether you leave many stalks in a hill, and how much you cut off the tops of your blackberries.

MR. HAMILTON.—I plant my blackberries seven feet apart between rows, in rows three feet, and I try to keep them in hills. They are supported by wire on either side. When the growth has got to the length of about two and a half feet, I cut the top of the cane off; that stops the upward growth of the plant. The blackberry is inclined to grow a long spindling cane. I cut it back and it forms itself into a tree. In laying them down, if the rows are running north and south, we will commence at the north end. We will remove the earth say four inches from the hill, and three inches under. That gives you room for this crown to set over in, and for the plant to set down in this hill, you turn it over and place your foot firmly at the base. Remember we are bending the root and not the cane. We put earth enough upon them to press the tops together as close as we can; then cover them, so that one lays alongside of the other. I put on just enough earth so that they are out of sight. I uncover them in the spring as soon as the earth gets in good workable order. It is better to uncover them early than late, because they will start under the earth sooner than they will if they are taken up. I shall not uncover mine until the middle of April, unless the season turns out much different than we anticipate. The thornless blackberry is something I have never seen, though some have less thorns than others.

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# THE FARMER'S FRUIT GARDEN.

By GEO. J. KELLOGG, Janesville, Wis.

Why have our apple trees died so badly all through the State in the last five years? The poor shape of the top is one cause. There is not one tree in a thousand that is put in the ground in good shape. The tree should have a central trunk, with side branches from six to eight inches apart. You don't want any crotch in the top. Just as soon as the tree forms a crotch, it is in bad shape to stand the effects of frost and ice and wind. It becomes cracked in the crotches and liable to break down. Do not have limbs nearer

than three or four feet from the ground for *certain kinds*, and other kinds five feet. If your trees are not in good shape, prune them into shape.

The Best Site.—The best site for the orchard is on the clay ridges. There is some stony soil out west of here that is better for apples than anything else, and you won't have to move the stones either to plant a few apple trees; you want to put them on the north side of the hill on the highest ground you have. If you have low black soil, plant but few kinds. There are plenty of varieties that will flourish in this State, if properly pruned at planting and cared for in the trunk. The trunk must be shaded. Mr. Philips, of West Salem, has gotten up a device which is a good thing for that — lath and wire woven together, and it surrounds the tree, protecting the south side from the sun in the winter and summer, and prevents the bark from bursting and the borer from getting in.

Just as soon as the sun scalds the southwest side of the tree, the borer gets in, and that is usually the first season. You should shade that side of the tree, and then the borer won't work and you will get none of this sunscald. It is the heat of February and March that kills the trees on the southwest side, and also the heat in June July and August. If you have nothing better at hand enclose the tree with brown building paper or newspaper, never using black; anything to keep the sun off. A wisp of hay, tied up and down will do, but Mr. Philip's device of lath will also protect trees from mice and rabbits, as well as sun-scalds and the borer.

The first few years I would raise in my orchard a low crop; potatoes are best. There are some places on which you can not grow apples, but in this low black soil you may, by ridging and planting on the back furrow, grow the Tetofski, a few of the Russians, a few of our native seedlings and Duchess and make a comparative success of it.

Plums—Cultivating.—If you don't raise your apples and your plums, you won't have them, as Mr. Hamilton says. The old Eastern varieties are not worth planting unless you jar your trees once or twice a month for two months. If you do that, you will fetch down the little bug that is on them, the Curculio, and if you will have your chickens under the tree you needn't bother to pick them up yourself. I would like to cultivate the orchard for two or three years, then seed it to clover so as not to get too great a growth; and do not cultivate your orchard later than the first of July. If you do, you will get up fall growth and the sap may be caught up and the frost burst the bark of your trees.

Seeding Down—Manuring.—After the orchard gets to bearing, or even before, if it gets to growing too rapidly, you had better seed it down. You do not want more than six inches of growth on the end of the limb, and then it goes into winter quarters in good shape. The only way for a tree that is growing too late is to pinch off the terminal shoots as far as you can reach them. Seed down the orchard about the time it gets to bearing, and after that your orchard is paying you, give it manure and keep up a good growth. The apple tree that bears heavily will make hardly an inch of wood. It should make at least two inches every year; so if your orchard is paying you in bushels, give it manure. There are more orchards starved to death in Wisconsin to-day than the winters have killed. The apple tree that bears for twenty years and never a wagon load of manure gets around it, ought to die. Manure it in winter, or

spring, any time you have the manure. Winter is the best time. Give it all the wood ashes you have unless you want them for the strawberry bed.

An Acre for Garden—Grapes.—I would like to throw out a few suggestions about the farmer's garden. I would like to have the farmer devote to it one acre of the best ground, that is fenced off, so the chickens cannot get into his garden. I want you to have this acre a long acre. Don't make it square; make it not less than twenty rods long. I would begin on the west side and go out eight feet from the fence, and put in a row of grapes. I would put the grapes on one side, because they will stand for a long time and pay you; and I want them eight feet from the fence, because I want you to get through there with the cultivator, and if it is twenty rods long you can afford to use the sulky cultivator. There are many kinds of black grapes—the Concord, Moore's Early, the Victor, Worden, Brighton and Delaware for red; the Lady, and the Niagara for white. The first year you want to throw all the growth into the cane, growing it up as high as you can; tie to any kind of support. You don't want an expensive trellis; you don't need a trellis at all until you get your vine bearing at three or four years. In the fall I would cut the cane clear down to two buds; the object is to give strength and growth. Then, I would let two canes grow and throw all the growth into these two canes the second year. Do not fail to prune your grapevine just as soon as the leaves fall in the autumn, any time in October or November or the first of December; then cover it with earth. You always want to lay down the same way. The second season grow two canes as big as you can; the second fall cut one of them off clear down to the ground, leaving two buds only.

Fruit-Buds—Foliage.—[Samples of cane and grape wood shown to the convention.]—There are three fruit-buds, each one capable of producing three bunches of fruit, nine bunches, which is more than you ought to expect of a two-year-old vine. After you have grown your vine until you get an old cane with side branches, prune and leave on but three buds of *new wood;* that is what bears fruit. You want to remember one thing—it is the foliage that ripens the fruit. I have seen persons cut off the foliage to let the sun get at the fruit. If you do that your grapes will stand right there until new leaves are made; they cannot breathe without those lungs. It is shade that makes nice fruit. Of course, if the foliage is mildewed, it will do no good; the ruit won't ripen anyway, but it will do very little harm to leave it.

Pruning.—The full bearing vine is at four years. You aim to have on that vine one hundred buds, thirty three spurs. If you remove the third bunch you will get almost as much on the two remaining as on the three. Do not let your vines over-bear; that is one reason the Concords did not ripen last year. We had a good many cold nights, too, in the fall. If your vines get so big and clumsy that you cannot lay the old canes down, no matter about them. If you can lay the *top* down and cover this new wood, you are safe. Always keep a new cane at the ground so that if the mice or anything should injure your old bearing cane, you can renew from these new ones.

If your vines have grown out of your reach, fifteen or twenty feet, just saw off the old cane and raise a new one near the ground, if you can afford to do without the fruit; or I would coax them along

through the summer, and in the fall I would renew them; but if they are out of shape, have not been pruned, you can do it this spring, after the leaves have been fully formed, you can cut the vines all to pieces and it won't hurt them.

Currants — Gooseberries. — The next row to grapes, I would put in currants and gooseberries, and if you don't want a whole row, finish out with pie-plant, but do not make the row less than twenty rods, and I would leave eight feet between rows; then you can take in a wagon-load of manure, or your cultivator, very easily.

Blackberries — Covering. — Next after the currants, I would plant the blackberry, because that is a high bush and you can't drive over it. Snyder is the earliest, then Stone's Hardy and Briton; you can plant all kinds. The Bartel Mammoth dewberry on rich clay soil is doing fairly well, and the Lucretia also. In digging to lay down your bush, I would dig on both sides.

You can cover blackberries very easily. In the spring get them out pretty early; they will stand the cold nights better, and they won't leaf out quite so quickly. I have left them in so long that the buds have become white, and I have lost the fruit.

Red Raspberries.— Next after the currants and blackberries, plant a row of red raspberries; the kind with suckers that come up all over the lot, and treat these suckers just like weeds and they won't bother you. Put in your rows eight feet apart. There's nothing better than the Turner and Cuthbert, and if you want to finish out your row with a kind like the black raspberries, I would plant Shaffer's Collossal. It is not as sweet as the other two, but it is a great bearer, a mongrel red.

Black Raspberries.— In the next row I would plant black raspberries, Tyler Souhegan and Gregg. There are two or three other varieties, the Nemaha and the Ohio.

The Gregg is the largest and latest; the two first are the earliest. I would cut the new growth at three feet so that they throw out latterals; they are easier handled and stand up against the wind better and are easier to cultivate. Now we have the five permanent rows, that will stand there for ten to twenty years, if you take care of them.

Strawberries—Setting Out.—Now we come down to the strawberry ground. You should renew your strawberries every two or three years; plant on potato ground. If you have to plant on sod ground, watch for the grub. He does not follow the potato or corn crop very much. In this first row of strawberries, eight feet from the black raspberries, I would advise you to set one whole row the length of the garden. If you put the plants three feet apart, one hundred plants will go the whole row. I would put in that row about four kinds of pistillate varieties, all in one row. I would not plant nearer than four feet. and one, two or three feet in the row. For the pistillates I would mention the Crescent, the Manchester, the Bubach, a new variety, and the Ontario for the fourth. In the second row, right opposite, because the blossoms of one have to pollenize the other, I would have the Wilson and the Jessie; the Captain Jack and the Miner. These are all good kinds.

Large Crops of Strawberries.— The Jessie has not done quite as well as was expected; on the lighter soil it may not do as well. A prize of twenty-five dollars was offered for the best show of fruit and the most pounds from 12 plants in the United States, and a man in Massachusetts drew the prize; he had one berry nine inches in circumference.

From twelve plants he raised 41¾ pounds. This is sworn to, and there is no question about it. This is at the rate of 1185 bushels to the acre. I am not prepared to tell you the minutia as to how he did it. He not only fertilized that ground to the highest possible point, but he knew just how to do it. Then he put on water enough to make up the rest. With plenty of water and manure you can almost defy the seasons in growing strawberries.

Mr. Smith, at Green Bay, piles up the manure six feet deep and *spreads it around* and goes to work. You want rich ground if you are to get a product of anything. I have known the Wilson to bear, on a square rod of ground, five bushels; that is 800 bushels to the acre. The first plantation I put out of the Cresent, the first season's picking, I put a boy on one row and he took off 100 quarts in nine hours from one hundred plants, but Crescent is worthless alone.

Hoeing—Cultivating—In growing any kinds of strawberries, hoe them the first season every Monday morning just as sure as your wife washes; it will pay you. Keep them cultivated narrow; if you can't hoe them, keep the cultivator going the best you can. In the fall just cover the foliage out of sight. Next season, set two more rows and four different kinds; then you will be sure of having berries right along.

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**Discussion.**

MR. TIFFANY.—How do you bring down the blackberries?

MR. KELLOGG.—Put the fork on top and then put your foot at the base. I can do it alone; it is better to have three. When the plant becomes larger, the cane heavier, dig around a little more and bend it in the root. You don't want to break the cane.

MR. LOUIS.—I find that a six-tined manure fork, stuck right over the top of the bushes and fastened in the ground gives me a good chance to cover them, and I can do it alone pretty easily.

MR. KELLOGG.—Yes, and you can use a board that way.

QUESTION.—What kind of manure would you recommend for the garden?

MR. KELLOGG.—The best rotted stable manure for the garden. Cover your strawberries with marsh hay or corn-stalks, or anything that has not clover or timothy seed in it.

CAPTAIN ENOS.—How was the land manured that raised 1185 bushels of strawberries to the acre?

MR. KELLOGG.—Not only was the best stable manure used, but commercial fertilizers were added to an enormous extent. Any of you can grow two hundred plants of well selected varieties and get three to five hundred quarts the following season, with fair treatment. By-the-way, don't have a tree of any kind around a vegetable or fruit garden. There is room enough for all your onions right alongside of the strawberries. Give your grapes the sunny side. If your rows run north and south, put your grapes on the west side so as to get the morning or east sun.

# SIGNS OF PROGRESS IN HORTICULTURE.

By B. S. HOXIE, Evansville, Wis.

**Knowledge Required.**—Horticulture is nothing more than intensive agriculture. If a man says that he is a horticulturist, you must expect that he knows something about the soil, its value and capacity; he must know something about trees, and plants and birds and insects; he ought to be prepared to answer a great many questions that the agriculturist would not know very much about. The diseases of trees and plants seem to be assigned to the horticulturists to be studied out, because they come more into contact with all these things. They are learning more about birds, those that are our foes and those that are our friends; they are learning more about all the species of trees that can be cultivated in our climate, or in any of the States of the United States, that are found in foreign lands; they are experimenting in different directions; they are lovers of nature and workers with nature.

**Progress in Thirty Years.**—We find, in looking over the history of horticulture, and the work that has been carried on by individuals and experiment stations, that we are now just beginning to find out something of the capacities, something of the blessings, the advantages of fruit and fruit culture. Thirty years ago, where there was one grape-vine growing in the United States, I presume to-day there are a thousand. You older people can remember when the Concord grape came out, and now it is the grape of the million. I think Prof. Henry, at the experiment station, has shown to the farmers of Wisconsin how many tons per acre the people of Wisconsin can raise, and just what it costs them. I think he states that we can raise grapes at about two cents a pound; but there is a larger value attached to fruit-growing than mere dollars and cents, and so there is in cultivating plants and shrubs about our houses, on the roadsides, and about our depot stations, and everywhere where you have something to beautify nature.

**Horticulture in the Schools.**—We should find the work of the horticulturist more evident on our school grounds; our boys and girls should know something about horticulture. I think if you should go into your school and ask the boys and girls how many varieties of trees you have in your beautiful village, and where they originated, there would not be one in fifty who could tell you; they would not know what the trees were good for, except to be a shade on the roadside, or, perhaps, for firewood. Now, in Austria and in Denmark and France they teach those things in their schools. They have a dozen schools in agriculture and horticulture in Austria where we have one in the United States. The boys and girls are learning all about birds and insects. Some have taken the ground that we should have an agricultural college in every State and a branch school in every county, and that the teachers in the schools should have a general idea of agriculture and horticulture.

Last year an application was made to me by some ladies who were running a school. They had a farm that was willed to them, and they wished to raise on it for their school all kinds of garden products, and wanted to find a man who knew how to take care of a garden and fruits, cultivate them, etc., and they supposed I could find one, and I thought I could. I wrote to J. M. Smith, of Green Bay, and he replied that he had had frequent applications for such men to take charge of gardens, and he did not know one, and the result was I was obliged to write to these ladies that I could not find them a gardener.

**Horticulture at the Exp't Station.**—This State has felt the need of a professor of horticulture for a number of years. Those who have been long engaged in the work of horticulture, experimenting in raising fruits, etc., have met with a great many disadvantages, more than they ought to, in some cases, and we have felt the necessity of a professor of horticulture, one who would put us on the right track, so that a man might know whether, if he planted, he could expect to reach any results. Prof. Goff, of the New York Experiment Station, has been engaged to come to this State to occupy the chair of horticulture in the University of Wisconsin. Prof. Goff is well known, though he is a young man, and we are hoping for good results, but do not expect too much. Do not expect that every farmer can set out apple trees and raise fruit to perfection, or that we can have every variety of fruit that is grown in New England; but let me tell you that a man who understands the business of experimenting on a right line of work and directing these experiments, if he is the right man, can accomplish far more than we can groping our way blindly.

**Fruits for Wisconsin.**—While Wisconsin is not so well favored as the middle States or Michigan in the raising of certain kinds of fruit, yet there are fruits that we can raise in Wisconsin with a greater degree of perfection than they can in any other State. J. M. Smith says there is no State in the Union that can raise strawberries equal in flavor and quality to the State of Wisconsin. We have to use judgment in all these things. Because Hiram Smith at Sheboygan succeeds at dairying, or J. M. Smith at Green Bay in raising strawberries, it does not follow that every farmer can be successful as a dairyman or in raising such fruit. Every man must do that which he is best adapted for, or his land is best adapted for.

Our fruit growers have done a good deal of experimenting, and so far generally to their cost, and we have made progress. We have found out that we can raise better strawberries and better raspberries and better balckberries and just as good grapes as can be raised any where in the world, and I feel sure that the farmers of Wisconsin can raise all the apples they need for their own use.

# DECORATIVE HORTICULTURE.

By JAS. CURRIE, Milwaukee, Wis.

**Objects of the Art.**—Decorative horticulture, as we understand it, means the art of gardening in all these branches, namely: The making and care of the lawn, the planting of trees and shrubs for ornament, and the cultivation of all kinds of flowering and ornamental plants, whether native or exotic, hardy or tender, in the open garden, or in the conservatory. The objects of this art are varied. You all know what a transformation it has, within recent years, effected in our cemeteries. The best of these, only a few years ago, were either bare and bleak, or if wooded, no better than the ordinary forest or clearing; in either case rough and uncared for, very desolate and uninviting. Now we find them places we even delight to visit. And then witness the many beautiful public parks, those grand resorts for the people of crowded cities, where they may go to enjoy, to their heart's content, the clear fresh air, rendered none the less pure by the sweet fragrance of lovely flowers, and the balmy foliage of trees and shrubs. In every instance these parks are indebted to the art of decorative horticulture for much of their beauty. All the beautiful private places, now so numerous in this country also bear evidence to this art.

**Taste for the Art.**— We cannot expect to find, in a country so new as this is, many places of large extent so beautifully laid out as we do in the older countries; but we have abundant evidence that the taste for this art is very rapidly developing everywhere throughout this country. The changed and ever improving appearance of our city and village homes assures us of this. Nearly every occupied lot now has its well-made, well-kept lawn, its handsome trees and shrubs and pretty flowering plants, and sundry other embellishments, rendering it attractive and beautiful. The country home of the city merchant is now less frequently seen situated in a thick forest or in a bare, uncultivated field. He has been obliged, perhaps, to take up his residence in the country for the benefit of his health; or his love of rural scenery has been the incentive. He delights to breathe the pure, bracing air of the country, and never tires of feasting his eyes on the extensive and varied landscape which surrounds his pleasant home. He is a true lover of nature, in all her native and rugged grandeur; but that does not prevent him from employing the landscape gardener's art to improve the immediate surroundings of his home. Some people condemn that art, because they consider it but an imitation of nature, and they cannot endure imitations of any sort, and this one in particular. But the true artist has really no intention of imitating nature's works. He employs her materials to create scenes which are polished and refined, pleasing to the eye and adapted to the circumstances. Under his masterly direction he produces effects, which, it is fair to say, are scarcely less natural, and certainly are more consistent in the vicin-

ity of the home, than any of nature's handiwork. Our country resident, therefore, who thoroughly appreciates the beautiful, as well as the picturesque in nature, and who has a keen sense of refinement, embellishes his home grounds, but is careful not to over-do his work. Good taste is strictly adhered to.

**Pleasures and Benefits.** — I am grieved to find so many people, possessed, too, of more than ordinary intelligence, who are stone-blind to the pleasures and many real benefits to be derived from decorative horticulture. They look upon it as a most unwarrantable luxury, still a very good way for fools and rich men to put some of their surplus money into circulation. The cultivation of flowers, they say, may be fit for women and children, but full-grown business men have no business with it, and any one who devotes any of his time and talents to it is a crank, with a strong tendency toward softening of the brain. What a delusion! All of you who have lawns and flower gardens, I know, will be prepared to corroborate my assertion, that the pleasures and benefits to be derived from the cultivation of plants, a well-stocked flower garden and nice lawn, with trees, shrubs and flowers pleasingly arranged, are almost innumerable and inestimable. Let me direct attention to one important benefit to be derived from the cultivation of flowers. The necessary labor is light and very interesting. It demands attention, but does not impose a burden on the mental faculties; it may be made really nothing but amusement; and, moreover, is conducted out-of-doors in the clear, fresh air and sunshine. Is it any wonder, then, that it proves so often such a splendid tonic for invalids and weary, care-worn business men? I fancy I hear some of you farmers saying: "That sounds very well, and may be all right in the city, but of what benefit is gardening of that kind to us? We have all the out-door exercise and labor in our fields that any man can want; and where have we time to bother with flowers and fine lawns?" This is nothing new to me. I have listened to many similar arguments many a time; but I am still prepared to defend the art, and most emphatically assert that it is as much at home on the farm as on the city lot, or in the public park, and its pleasures and benefits may be participated in and enjoyed as much by the farmer as by the townsman. I take my stand with the greater confidence, because I am assured of the support of every farmer's wife and daughter, and of all those farmers whose handsome homes we find here and there throughout the country, a delight to their owners and even the pride of their neighbors.

**Make Your Homes Attractive.**— Farmers, I admonish you to make your homes attractive, to satisfy your wives and your children! We hear a great deal about providing children with amusements at home, that they may have less desire to go elsewhere to seek them. Then, why not give them a nice garden, and encourage them to spend some of their leisure hours in it, and buy them a few plants and seeds, and let them cultivate their own flowers? Very few children are averse to this kind of work; it is amusement to them, and, as you are aware, most healthy recreation. Many a very delicate boy and girl, even on the farm, have, by the light work in the garden, which kept them employed in the open air, been nursed up into strong and healthy men and women. The city has great allurements for the farm boy. I am by no means opposed to his coming to town, for we need our Lincolns, Garfields and

Rusks to man the ship of state, and we look to the farm for them; but we cannot afford to deplete the farm, so we must offer every inducement to keep the boys at home. Try to make your homes the pride of your children so that though they go on a visit to town, they may see, at least, few homes more attractive than their own. You can easily do it; you have generally the best opportunities. The soil on the ordinary farm is of good quality. An acre devoted to the lawn is never missed from the farm. Labor is not an expensive item, because the work of making the improvements can be done at odd times when farm work is not pressing. Trees, shrubs and hardy flowers, which are no further expense than the first cost, are now very cheap. The future care of the lawn involves very little labor, as light running lawn mowers, which the boys even consider as play-things, do the work of cutting the grass rapidly, and leave the lawn looking smooth and trim. Try it, there is nothing to lose, but much to gain. There is besides money in it. Who does not acknowledge the superior value of the farm which has a neat dwelling, situated on a broad lawn, nicely laid out and well cared for, and planted with a variety of handsome deciduous and evergreen trees, artistically located, and a few beds of pretty flowers as finishing touches to heighten the general effect—the ordinary farm buildings being situated some distance in the rear, and all the objectionable parts screened from view by trees and clumps of shrubbery; and along the side of the public road, a line of hard maples or other equally desirable trees. All other things being equal, do you not look on such a place as the ideal farm? I know you do. I do, and often wish I was the owner of such a farm.

Within recent years the value of decorative horticulture has attracted the attention of several of the great railroad companies of this country, particularly those operating roads in the East. They employ it extensively about all the larger depots along the lines. Thoroughly capable landscape gardeners are permanently employed to direct all the operations. All the available ground in the vicinity of the depots is judiciously and carefully laid out, and tastefully planted with trees, shrubs and flowers; and the grass is always kept short and green. The effect, as may easily be imagined, is very pleasing to the travelers. This work is certainly very commendable and does great credit to these companies.

**Beautifying School Grounds.**—The beautifying of our school grounds to some extent with trees and flowers is a question now being widely discussed. I deem this a subject of vital importance for many reasons, too numerous to mention here; I can only trust that, ere long, we may see every school ground throughout the country so ornamented.

**Materials.**—There is no lack of materials to use in decorative horticulture. Trees, shrubs and flowering plants of suitable kinds are in abundance, and sufficient for the purpose, even though our rather severe climate precludes the culture of many beautiful sorts. But the kinds we have are already so numerous, and the desire to use them all is so strong and tempting, that much wisdom and self-denial are required to choose only a sufficient number of the most appropriate sorts for the location and space they are to occupy. The general tendency is to over-crowd. It is so hard to satisfy ourselves with one tree when one is sufficient for the purpose, and our judgment even tells us so. The love of flowers has that tendency even more strongly. While their culture is always

commendable, great care must be exercised in selecting them, and giving them their appropriate place. The flower garden or border is the proper place for a large and general assortment—a bed or two perhaps being sufficient to tastefully embellish the lawn.

Let me conclude by hoping that the taste for decorative horticulture already making rapid progress, may quickly become universal, so that in the future every town and village lot, and every country place and farm home may be tastefully adorned with fine lawns, handsome trees and beautiful flowering shrubs and plants.

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# SOILING VS PERMANENT PASTURE.

By HON. HIRAM SMITH, Sheboygan Falls, Wis.

**Innovations in Methods.**—I am well aware of the prejudice existing, and the suspicion felt, towards any innovation in the old established methods of farming. We have all been brought up to regard the pasturing of animals as the true way to keep them through the summer, cutting hay mainly on which to winter them, and many who do not figure very closely, or reason very logically, conclude that there is no better way of keeping animals than the way they were taught; but the competition existing in all branches of business and trade has forced many either to abandon the work they were engaged in, or devise some means by which they could increase the productions of their farms, and add to the animals from which they received their remuneration for their work.

**Milch Cows Require no Exercise.**—It occurred to me some years ago that soiling cattle from the green crops that grow upon the land, could be done with less acres than to pasture the cattle. Of course, many will think that this is a poor way to keep cows, and we often hear the objection that they ought to have some exercise. It has been satisfactorily proved, by repeated experiments, that an animal that chews a cud requires but little, if any exercise, and a cow that is producing milk does not require any exercise at all. I have tried it, and many others, and I think we are fully convinced that a cow that is giving milk does not need any exercise any more than a horse that works on a tread-power. The elaboration of milk is as great an exercise as the elaboration of power from the feed the horse consumes to apply to the tread-power. Therefore, the next question is a question of money. How much more stock can we keep? How much more food can we get from an acre that is left to nearly mature in a proper soiling condition, than we can to let the cows roam over the land? He who has watched the habits and characteristics of cows knows very well that the cow will visit every rod of the field she is in, and if, say, one animal occupies two acres, every foot square of that soil is tread upon every day that they are in the pasture.

It is well known by those who have observed closely that a cow, or any other animal, for that matter, that travels over the soil to get its own living from cropping the grass, fouls and treads down two-thirds of all the grass upon that acre, so that it is but a matter of economy to maintain our position. If we can keep three cows where we kept one, here comes in an opportunity to make our business more remunerative. If we have been working hard, living without many of the comforts and none of the luxuries of life, and found it difficult to meet our taxes, and if, by putting on three cows where we had one, certainly we can thus better our condition, and at the same time better our land, for the more stock we keep, the more fertilizers we shall have to raise larger crops.

**Soiling and the Silo.**—The history of soiling in this country is somewhat analogous to the history of the silo. It has been found that by raising a crop of fodder corn and putting it into the silo every acre will winter three cows, and there is hardly one acre of meadow in Wisconsin that will winter one cow. If we take into consideration how much we have gained by the silo, we shall be easily convinced by a little experimenting and observation how much we shall goin by soiling our cows instead of pasturing them. After I have been at this business some six or eight years, it seems as though it ought to have been thoroughly understood long before this. I get somewhat impatient sometimes at the slow progress that has been made. After experiments have repeatedly demonstrated, and the results of such experiments have been published, it seems almost superfluous to talk in favor of soiling cows.

**Keeping Cattle in the Barn.**—There is another consideration that we should look at. In the fore part of the season the ground is soft, mellow, physically all right to produce a crop. The frost has done its perfect work and left the soil in a loose condition, so that the crop may grow and flourish and have a chance to mature as nature intended; but if we put on every two acres a heavy animal, weighing from ten to sixteen hundred pounds, trampling over that ground, treading it in its soft condition, packing it down closely, it gets it into a condition where the soil can furnish hardly more nourishment than a stone. It has been packed so that it will not give forth fertility or moisture. A plant to live must have moisture, must have room for the roots to grow. They will grow, as you know, very little after the first of July, and consequently we almost universally have dry, short pastures for the cattle, and they soon run down in their production and become of very little value after July or August; not so much because there is hot weather, but because the land is packed so closely that the plants cannot grow. There is not the slightest doubt that the crops will be in better shape, if the cattle are kept in the barn.

**Expense of this System.**—Many urge sincerely and honestly the great expense of this system; but if you will take your pencil and figure the expense, it looks so small that you are almost ashamed of it. One boy, seventeen or eighteen years old, will take a team and go into the field of clover, or corn, or millet, and get sufficient in for the night's feed and the next morning's feed, and clean out the stables, and get it all done in half a day. After his milking is done, there is actually only a quarter of a day spent with one man, and his wages amount to sixty cents a day, if hired by the month, so that it costs fifteen cents to soil one hundred

head of cattle every day in the year. I doubt if it takes any longer than it used to do when we drove the cows out to pasture, and had to go out and hunt them up and gave them nothing in the barn; they had no inclination to come to the barn, they had to be driven into the yard, and it took a good deal of time—quite as much, I think, as it now takes to soil the entire herd. If some wealthy man wanted his farm well taken care of, and should say to me, "if you will take this one hundred acres and twenty cows and take care of things properly, you may have all that grows on it," and another man with two hundred acres and eighty or one hundred cows, told me he would let me have the farm at halves, I would jump at the chance to take the dairy farm well equipped with a silo and everything, rather than to take the small farm and have it all. I couldn't afford to do it. It would give me no wages. An acre of land will produce more feed for summer feed than the best two acres of meadow in Wisconsin.

**To Double the Farm's Receipts.**—Here is an opportunity, with the system of the silo, to double the receipts of the farm. As many again cows can be kept at very little more expense, a few hired men more, but no increase of teams or farm machines—scarcely any additional expense except a little more hired help, and the vast increase in the production will warrant four times the expense it will cost. Corn put in the silo makes a great deal better feed than hay, and makes as good butter as ever was made in June, and the change from summer to winter dairying costs almost nothing. It may be done gradually; the cost is nothing, and there is all the time an increase of production.

Now, if you can, by adopting these methods, throw aside your old prejudices and quit reading accounts of the census reports of the grass crop, you will find it will pay; it will figure in your bank account. I have sometimes, in an early day, wintered in the lumber woods, taking a cow along and keeping her ten or twelve weeks, never out of the stall and never producing better. Prof. Daniels, at the University, has for years, put a new milch cow in the stable from November till May, and the experiments have proved that the cow does not need exercise; she will produce more without it than with it. There is a constant loss when cattle are traveling over the pasture looking for something to eat.

**About my Silo.** — Somebody has asked about the silo. My first silo I filled with corn, and fed to ten cows in the barn. I filled the silo from less than three acres, and kept ten cows over the winter, and three cows until the last of August so as to see what the effect would be in the production of milk in the winter. They were confined in a small dry yard; there is a shed in the yard, and water from a spring, running through a pipe. They had plenty of water and all the ensilage they could eat, and eight pounds of bran. We fed a little hay, but they did't care for it; therefore I fed the cows all winter until the last of August without any other feed, practically, but ensliage and wheat middlings or bran.

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**Discussion.**

MR. SHERMAN.—Is it practical to feed ensilage the year around?

MR. SMITH.—I am satisfied that it is practical, although I would give a change—different kinds of ensilage, a little clover, and a little corn, and always a little dry hay, if they care for it. The milk from those cows was weighed and computed against the milk of three other cows running in the pasture, and

they did equally well and only ate what grew on one acre, whereas the three in the pasture ate what grew on six acres. That is the practical result of the experiment.

MR. SPEAR.—Have you had any experience with clover ensilage?

MR. SMITH.—I have put in a second crop of clover with good results. It is the cheapest way to handle a second crop of clover, and the first crop also.

MR. CLINTON.—What crop would you raise for continual soiling?

MR. SMITH.—I know of nothing cheaper than corn ensilage. Let that run until about the 20th of June when the clover begins to blossom, and that is in good condition for soiling food. We could use the clover for soiling only about ten days, beginning about the 25th. of May. Then, the clover is good enough, and upon good productive land you can get three crops of clover, that will carry you until the fodder corn is in the roasting stage. Fodder corn, if cut before there is any appearance of ears, has but very little value; it is a great waste to cut it until it is near the roasting stage. When it reaches that stage it will do to cut, and you can feed that corn until you open your silo in the winter. There is no difficulty in this climate in having a succession of crops that will do better, with a greater variety, than almost any other method of feeding cows.

There has been a good deal read and published about permanent pasture. Some of you may remember that Prof. Brown, of the Agricultural College of Canada, two years ago, was very enthusiastic over what he called a permanent pasture. He sowed some twenty-five or thirty different kinds of grass seed, and reported very large results the first year; but after two or three years it ran out; only four or five kinds of grasses could be found in the field. I visited that farm last year, and asked the farmer how the permanent pasture turned out, and he said: "It is no good; you can go and see it." It had proved a failure, comparatively, and while I was there, in October, I am satisfied that one cow would eat all that grew on six acres, and it could not be depended on to keep up the flow of milk. We have still to find out that there ever was such a thing as a permanent pasture except from native grass or the June and white clover. Of course, pastures can be improved by fertilizing, and made to produce a good deal more than they otherwise would, but they cannot be made to produce more than one-half, if the cows are allowed to travel over them.

PROF. NORTH.—You are aware that there are permanent pastures in England and Scotland?

MR. SMITH.—Yes, but I doubt if there is one of them which can produce anywhere near as much as a soiling crop, for the reasons I have stated. In France they seem to be aware of that fact, and although they allow their cows to crop the grass from the field, yet they have a long frame on wheels, the cows are put in stanchions and the wheels are rolled up until they eat just within their reach and then they are wheeled along farther. They can't tramp and waste the pasture, nor can they waste their substance in extra exercise. This, however, is not what I understand by pasture where cattle range at large.

MR. GORDON.—Don't you think that cows need a good deal of sunshine?

MR. SMITH.—Yes, I think they do. If you have a good, dry yard, perfectly adapted to the business, they can get just as much sunshine as there is. Of course, we don't keep the cows in the stable every minute.

MR. KELLOGG.—Why do you give your cows warm water in the winter?

MR. SMITH.—Because we think we save a little feed, and I don't know as we are certain about that. The experiments don't quite back it up. Chemists told us that it required the expenditure of food to heat water that was down to forty degrees up to ninety-eight or one hundred, as the cow must have it. I think the main reason we have adopted the warm water is that we think we save some food, and the cows certainly appear to enjoy it. They drink more of it, and if they give a little more milk, even if it don't make any more butter, we get a few more pounds of milk, at any rate.

MR. BROOKS.—Do you cut up your corn that you feed in the summer?

MR. SMITH.—No, I do not, unless it is past the roasting stage, but I take it green from the field when I feed it whole.

MR. MCKERROW.—Do you think you ought to deprive the cows of exercise?

MR. SMITH.—They seem to enjoy themselves. You see, a cow will chew her cud six hours every day, if she is properly fed, and it is about as hard work as chewing gum.

QUESTION.—Do you think the vitality will continue in their progeny from generation to generation, if deprived of exercise?

MR. SMITH.—I never was a man to look into futurity, but I don't know of any reason why it should not improve them.

MR. HOXIE.—Do you allow your corn to wilt before you draw it in?

MR. SMITH.—We cut it in the morning and let it wilt.

QUESTION.—Do you feed your cows ensilage before or after milking?

MR. SMITH.—Either way, both ways. I feed two feeds a day of ensilage.

MR. KELLOGG.—Is the idea of Southern corn being the best going out, by experiment?

MR. SMITH.—I have seen no results bearing upon that. I do not think there have been satisfactory experiments on the subject. I have always been satisfied with it. The stalk is tender and juicy, and we can raise more corn on the acre of that kind than any other kind. I have made ensilage of four or five different kinds. As I say, I raise mainly B. & W. corn, but in order to begin filling the silo early, I raise some of the Wisconsin White Dent, which has a very heavy crop; there will be fourteen or fifteen tons on the acre, generally, and it makes very good ensilage. It ears pretty well, and we can get to work at least about two weeks or ten days earlier than we can on the B. & W.

MR. LOUIS.—During this winter I have listened to the dairymen at the various institutes, and there seems to be an idea in our State that the corn must be almost in a matured state to go into the silo for food for the cows. From a breeder's standpoint, I think that in time it will become dangerous to the breeding qualities of the animals. What I call mature is what I call ripe.

MR. SMITH.—I have seen some very bad effects from corn getting ripe and being fed. One man at Oshkosh had read that the corn should wilt three days after being matured. Then he read that it was better to let it stand in the shock, and he did that and the consequence was that his corn was hard and dry; it did not have moisture enough to heat up to the proper degree and he nearly lost his crop. My impression is that when it is in the roasting stage, just big enough as we pick it to eat ourselves, it is just in the right condition for the cow. I don't think we ought to

use our cows much worse than we use ourselves.

MR. CHAFFEE.—Can you get the B. & W. corn in your locality to the roasting stage before it freezes?

MR. SMITH.—I have never had any trouble.

CAP'T. ENOS.—Are you far enough from the lakes not to feel the effect of the lake breezes?

MR. SMITH.—The lake breezes effect poor land very badly; they don't seem to affect rich land very much. We have frost earlier than they do within a mile of the lake.

A GENTLEMAN.—Upon my farm I have experimented for the last three or four years. I have been soiling my herd of cows for the last ten or twelve years, as the pastures began to fail. Last year I made a couple of experiments. I measured off the same quantity of land in the same field and got this large corn that grew up twelve or thirteen feet high, and side by side with it the Evergreen sweet corn, and the result of two or three experiments was this: On the same amount of land, ten square rods, measured off, that sweet Evergreen corn beat the big corn. The percentage was not very large, but when you take into account the avordupois of the products of the two pieces of land, the percentage was quite considerably in favor of the sweet corn.

MR. FLEMING.—In what stage of maturity were these two kinds of corn fed?

A GENTLEMAN.—They were planted at the same time, and the experiments were made, first with the sweet corn, then with the large corn, then back again to the sweet corn and back again to the large corn. Perhaps the sweet corn was a little more matured, but we alternated between the two, and in every instance the sweet corn came out ahead. We kept it up until we were obliged to cut up the corn.

MR. FLEMING.—At any time when you were feeding the big corn had it got to its best?

A GENTLEMAN.—Yes, the last experiment, particularly. I watched it very carefully. Do not understand me that we got the same amount of pounds from the sweet corn per rod that we did from the large corn. I estimated the difference in the weight of the two pieces was from twenty to twenty-five per cent. This was for soilage, you understand, not for ensilage.

MR. KELLOGG.—Mr. Smith, how much seed did you use?

MR. SMITH.—I used about eight to ten quarts of seed to the acre, and planted with a horse drill, dropping one kernel every ten inches, and the rows are three and a half feet apart. It is thoroughly cultivated with a disc harrow before planting; then it is planted about one and a half inches deep, in rows as straight as a man will drive a horse, which is generally straight enough. As soon as that is done, and sometimes before, the team follows with a smoothing harrow that is kept going every day or two, until the corn is up four or five inches. Then the cultivator is started, one or two inches deep if we can arrange it, and that is kept going until the corn shades the ground; then the weeds don't bother any more. I plant one kernel, because, especially in our latitude, four do not do as well. If four are planted in one place, four sets of roots start out in competition with each other to get what moisture they can reach, while it is in that delicate condition striving for life. I have sometimes made the remark that it is no more sensible or philosophical to plant four kernels in a hole than to plant four apple trees in the same hole.

MR. WAGNER.—When you are soiling, do you feed in the open yards in racks or in the manger in the stable?

MR. SMITH.—I never feed the cows anywhere except in the manger, and only twice a day.

CAPT. ENOS.—I would like to ask as to the relative merits of the large B. & W. corn and the Evergreen corn, point for point, ton for ton, in the same stage of maturity.

MR. SMITH.—There are investigations in progress at the Experiment Station on that point. It requires a great deal of patient work, which has to be duplicated several times to be reliable, but the work is being prosecuted there.

CAPT ENOS.—I will state that my old Scotch farmer and myself have arrived at the conclusion that we plant no more of the big corn, that is after three years' trial. We have concluded to fall back on the sweet corn alone for soiling purposes.

MR. SMITH.—I think Capt. Enos will fool away two or three years' time, but he will have to give it up. Eight years ago I thought and talked just as he does now; I went around and harvested about eight tons of Evergreen sweet corn, and got from sixteen to twenty tons of the other, and forty-five pounds of the big corn makes a pretty good daily ration for a cow, and especially a Jersey cow, through the winter. The difference in the amount greatly overshadows the supposed better quality.

MR. GORDON.—The last experiment, published by the Experiment Station of the State of Minnesota give us experiments with three crops of corn, as to the nutritive value from the silo. Prof. Porter groups the corn as to nutritive value in this way: First of all in nutritive value, the dents; second the flints, and third the sugars. Among the dents, first, the B. & W., in the roasting stage; second, B. & W., in an immature stage; third, the Pride of the North in the roasting or glazed stage; then one flint comes in as an accident, then comes in the rest of the dents, including almost all of the Southern and Western dents. Then comes the group of flints, and last of all comes the Evergreen, and Stowell's Evergreen is almost at the lowest point among the sugars, and Prof. Porter recognized very clearly that that range applied particularly to the Northern States.

CAPT. ENOS.—That is for ensilage purposes, not soiling?

MR. SMITH.—I think they are practically the same.

Mr. ROOK.—I have raised B. & W. corn for summer feeding and for ensilage for several years and found it very profitable, when my neighbors had nothing to feed their cows, and it was easy to induce a great many to plant a little for summer use. After the first season they would nearly all say: "I will never raise that corn again; I don't want to handle that great stuff." But I don't find it so hard to handle.

MR. SHERMAN.—How do you cut the corn ready for the machine, Mr. Smith?

MR. SMITH.—I cut it with a Champion self-raking reaper.

CAPT. ENOS.—Do you keep all the sweeps on?

MR. SMITH.—Yes, they act as reels. The ordinary rake isn't heavy enough and at first we put a man behind with a garden rake to help the rake, but it occurred to me that if we weighted that rake it would be all right, so we weighted it with a bar of iron, and had no further trouble. It will not do to have new knives on the sickle bar, they should be worn off short; it will break a new knife; old blades are just the thing. A good deal of my corn was thirteen and fourteen feet high, and we had no trou-

ble in raking it off. It does not come off quite in the nice gavels like grain, but it is easily picked up; let it lie in any shape. Single stalks will weigh from three to nine pounds. We have two poles on a truck, put on a bolster in front, leaving it behind, under the bolster, so it is just high enough to clear the ground. We simply end it over on the pole, and it is very easily loaded. I have heard a great many say that it is impossible to cut with a reaper, but you put a good team on an old Champion reaper, take one row at a time and drive a good fast walk, and the trouble all passes away.

MR. SHERMAN.—I visited Mr. Fargo, at Lake Mills, and he tells me he raised B. & W. corn seventeen feet high. I don't see how you could cut that with a reaper.

MR. SMITH.—It doesn't make any difference about the height of it. The end strikes the ground and drags it off; but there is practically no difficulty.

## PRACTICAL EXPERIENCE WITH ENSILAGE.

By WELDON VAN KIRK, Winnebago County, Wis.

**The Silo Appreciated.**—It goes without saying that the silo is coming to be appreciated. So far as we have had a chance to observe, there is a healthy, growing sentiment in its favor. It is a fact that the prejudices so long, so persistently and so sensibly entertained against it, by the mass of our farmers who have gotten the greater part of their education in the hard school of experience, are becoming extinct just in proportion as the red tape, and I may almost add the superstition, that have so largely made up our knowledge of it in the past, dies out. Is it any wonder that the matter-of-fact man of small means should look with distrust on a system so long and so poorly manipulated by men with more money than good judgment, and whose chief satisfaction—for there was no profit—was derived from the fact that they had something that a poor man couldn't afford to have? It is to the credit of Yankee ingenuity that so good a thing as the silo should be recovered from among the projects of the millionaire farmer, and brought within the easy reach of any man who has a grain of energy that he cares to exert in that direction.

**The Silo Simplified.**—Plans for building and methods of filling and emptying, once thought to be imperatively necessary, that practically placed it beyond the reach of the average farmer, are now known to be useless, and worse than useless. Year by year the whole matter has been simplified, the cost reduced and the production improved. For example, we were told, only two years ago, that the lining must be of planed, matched floor boards, at a cost of from $18.00 to $22.00 per M., and most of us believed it. In our own experience we were unable to get that grade when we built, so put in common lumber at $11.00, and saved our money by it. For all practical purposes we find it just as good.

**The Round Silo.**—We have no hesitancy in predicting that the orthodox silo of the future will be round. It is easy to compute that this plan will still further reduce the cost, and will effectually do away with the corners, where nine-tenths of all our losses occur. Those having buildings or parts of buildings which they wish to utilize may devise some way of rounding the corners and thus secure the same results; but I am of the opinion that a radical change from the old plan of building square corners is necessary to obviate the difficulty.

It may be excusable on the plan of thoughtlessness in the man who hires all his chores done, to *locate* his silo across the barn-yard from the stables, but he will pay dear enough for it in the end.

**The Crop to be Depended On.**—The question that seems to us most imperatively to demand the attention of ensiloists at present is that of the crop to be depended on. Prof. Henry says that red clover and corn are the crops that the farmers had best fall down and worship and not be running off after strange Gods. Our silo has been filled two seasons, both with the large southern ensilage corn. A year ago last summer, on account of the drouth, it proved to be the best thing we could have planted. We were so well pleased with the large growth that it made when other varieties were a comparative failure, that we made the mistake of depending entirely upon it the past season, notwithstanding the cold, backward spring made it impossible to begin planting before the middle of May.

**Filling.**—The first year, having given up all hope of seeing any ears, we commenced filling the last week in August, and without waiting for the corn to wilt. The result was sour ensilage. Later on ears made their appearance, and before the last of it was in, they had nearly reached the glazing stage.

In feeding it out, we found that on the top sweet, and very much better than that put in first.

This year, thinking to improve by last year's experience, we waited until the last week in September before commencing. Within a week from the time we began, the frost came, and the general appearance of the corn field reminded one of the cedar swamps of Peshtigo, killed, but not consumed, by the great fire of 1871. Had we possessed the good common sense that it would seem any granger ought to have, we would have rushed it into the pits at once; but that erroneous idea that each successive day's filling must remain uncovered until it reached a certain heat had possession of us, and unable to bring ourselves to a point where we dare go against the doctor's orders, we took it slow and let the leaves dry up, except as we were able to prevent their doing so by cutting the corn and throwing it into large gavels, five or six of which would make a load. Dry weather followed, or heavy losses might have resulted from that method of handling.

**Slow Filling not Necessary.**—I have come to be most emphatically of the opinion that slow filling is not necessary to the making of sweet ensilage; that much more depends upon the crop having come to maturity before being put in, than upon any particular method of filling.

**Planting Native Corn.**—Our plan for this year is to plant a part of our acreage to some native varieties, something that we can begin on early, and thus get through if possible before frost comes. We shall, of course, not get as many tons per acre, but we hope that

what we lose in quantity will be partly made up in quality. The fellow who, day after day, will handle the B. & W. corn and not stop occasionally to wonder if the water he is lugging round is really charged with anything of very great feeding value has more muscle than brain.

**Covering not Necessary**—Perhaps in regard to no other matter concerning the silo has so many erroneous theories been entertained, and one after another been exploded, as in the matter of the cover. Since the time when it was thought necessary to put on one-half a ton of weight to every of ton ensliage, we have learned that it is not absolutely necessary to put on anything, and while economy may dictate that it is better to put on a foot or so of cut straw, green marsh grass, or something of the sort, rather than to sacrifice that amount of ensilage, yet no fears of any extensive loss need be entertained if no cover at all is provided.

The past season we expended a good deal of energy tramping the cover for the purpose of making it follow closely after the ensilage, as it settled, and thus exclude the air. We were somewhat surprised on opening it, to find as much mould as we did, but have since figured out that the only result of our tramping was to shatter the otherwise air-tight blanket of mould that kind nature was forming in that buckwheat straw, and in so doing let the air through and necessitated the forming of another layer underneath.

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**Discussion.**

MR. SHERMAN.—I built a silo, but failed to fill it. It is long, and one end opens towards the cows and the other towards the sheep. I want to know if any one here has had experience in feeding ensilage to sheep and cows and horses.

MR. MCKERROW.—On the Sherman farm, Springbrook, they have been using ensilage for several years; also the Messrs. Brewer, who are large sheep feeders, and they all tell me ensilage is giving good results in feeding sheep. Prof. Cook, of Michigan, tells me he has had fine results in the same line, and I have failed to meet any sheep feeder who has been dissatisfied with it.

MR. KELLOGG.—I put in a silo last year; I have been feeding two horses a bushel apiece, once a day. I have been feeding one brood mare, one driving horse and two colts, and we give them that which is not the best, taken out of the corners, and they like it and are doing well on it.

MR. THOM.—I have a horse which I cured of the heaves this winter with ensilage. It has had the heaves for four or five years, and has had ensilage and oat straw exclusively during the entire winter and to all appearances there are now no signs of its having the heaves. It has been in harness nearly every day this winter.

MR. HOXIE.—I think there is quite an important point in filling the silo—rushing it in. We have been taught heretofore to put it in one day and wait two or three days for it to heat up. It seems to me that it is a very important fact to know that if we get caught with a frosted field of corn we can put on men and get it in quickly, before it spoils.

MR. FAVILLE.—More than half of my ensilage was put in after the corn froze. It caught our common Dent corn pretty badly, but did not affect the B. & W., standing side by side. The B. & W. was perfectly green, and the leaves of the other caught it. We commenced filling the silo and had a hard frost two weeks

afterward, killing everything, even the B. & W. We hurried it into the silo, and the ensilage from the last is sweeter and better than the first that we put in. If it had rained, however, during the time, I have no doubt we should have had a poor mess of stuff. I don't think the frost did it any harm. There was no frost in the first that we put in; it was perfectly green. In the corners there was quite a difference in the quality from that in the middle. It was not rotten, but it was vastly more acid.

MR. HIRAM SMITH.—I think if the corn is just in the roasting stage, that there is no sort of trouble about filling the silo as rapidly as we please. In fact, it was thoroughly tested last year at the experiment farm. You will notice, in the bulletin of Prof. Henry, that he filled it in one day fourteen feet deep. The corn was cut and put in as soon as they could do it. I think if it is all filled in one day, it will heat up. There is air enough carried in with the feed as it passes from the carrier into the pit to heat it up. Very green corn, of course, would not do so well.

MR. THOM.—I know a silo holding three hundred tons of corn say in the roasting stage, filled four feet at each filling, heating to one hundred and twenty. That silo does not contain a pound of ensilage that any stock will eat; it is as black as your hat, all the way though, and I would like to know what is the matter with it?

MR. SMITH.—Do you know whether the pit was made properly—was it air-tight?

MR. THOM.—It is as well made a silo as I know. It is inside the barn; it is made of two thicknesses of matched lumber, with tarred paper between. The corn was cut from the stalk.

MR. SMITH.—I don't know of any reason. It is one among a thousand instances. The great majority of silos that are filled come out perfect, and I find the corners will come out as good as the rest, if before filling the second day they are pitched out, and the heated ensilage from the center pitched into each corner, where it is colder.

MR. SAWYER.—Had the silo spread any?

MR. THOM.—No sir. There is one point that I should state. The man filled the silo from top to bottom without going near the inside. It was not spread or tramped at all. It was filled in the center of the silo.

MR. FLEMING.—I can readily see from that statement one of the reasons for the ensilage being in the condition you say it was. Being simply pitched into the silo, and not evenly distributed in regard to the heft of it, the lighter portion of the ensilage dropped near the wall from the carrier, while the heavier portion, of course, was thrown over and settled much more than the other. The fine portions did not have sufficient weight to pack, and, of course, left spaces through which the air passed and penetrated the whole mass.

MR. THOM.—We visited Mr. Byron Snyder's silo, and saw where the ensilage had drawn away from the walls.

MR. PEFFER. — If the gentleman's silo had been built like mine, I don't think that would have happened. I made mine about two inches smaller on the bottom than on top, and as it settled it always got harder instead of loose.

MR. GORDON.—I saw on the farm of Mr. Morgan Manuel, perfect clover ensilage. I asked him how he did it. He said that he cut the clover when the top blossoms were brown and the lower part of the stalk was a little woody; cut it after the dew was off, and put it in straight, without cutting or any further work; kept it thoroughly distributed,

and then weighted it a little with plank and other weight, just sufficient to overcome the natural tendency of hay not to settle. It was the most perfect article of food I ever saw in my life, rather brown and green; had not any of the Limburger smell that clover ensilage generally has. He says the secret of clover ensilage is in putting it in in exactly that stage. I saw one silo where the clover had been put in alternately with corn and not cut, but the clover smelt like Limburger cheese; the corn was all right.

MR. HODSON.—We put some in this year, and cut it and it is a perfect success. Since we began to feed it, the herd has gained about two pounds a day. I venture to prophesy that some day not far off all intelligent dairymen will put up half of their ensilage in clover.

MR. SHERMAN.—I have had bad luck. I put in five jags of clover. It was not very good clover; it was a little past the green stage, rather getting ripe. It did not heat up satisfactorily. I dampened it and tramped it, and made a square billet of wood and pushed it down, but still I haven't anything very satisfactory.

MR. FAVILLE.—I filled the silo with clover two years ago, and it was very satisfactory. I haven't filled it since for the very good reason that we haven't had any clover. Our cows ate it very greedily, and gave milk on it just about as they would eating green grass.

MR. SHERMAN.—I filled my silo because I wanted some of the protein these men are talking about at the experiment station. I do not believe the hogs will touch it, but I am sure the cows will eat it when they can.

MR. THOM.—Is there a man present who owns a silo who wishes he had the money back that it took to build it. I would like to see the hands of those who own silos. I see twenty-two. That's pretty fair for a beginning.

MR. GORDON.—I would like to have the money back from mine, so that I could build a larger one. I believe that the secret of all this matter rests largely in furnishing one's mind first with a theory—the correct theory of ensilage. We have been talking broad. It is very useful to get the practical side of the question presented, with all the mistakes and all the successes of the silo, but I believe we must get firmly into our minds the complete theory of ensilage so as to be able on our own farms to meet the accidents and incidents that we have to meet and never have seen before It was a new thing for me to get up in the morning and find all my corn frosted and not a bushel in the silo, but Edward Fries' little book, that costs fifty cents, gives you the theory based on the natural law of what ensilage is, that you may meet those emergencies very easily by exercising common sense. For instance, I found that the corn had dried up one-third of the way one year. I was puzzled to know what to do, but Fries' book set me right about it, without having to look through one hundred speeches of practical men. I believe you had better, all of you, send for this book, which is the only book in the English or French language that gives completely the theory of practical ensilage. It is Edward Fries' book, sold for fifty cents by the WESTERN FARMER COMPANY, Madison, Wis.

MR. KELLOGG.—I put up a silo last season and filled it with B. & W. corn. The lower leaves had yellowed for three feet on the stem, but it is coming out very satisfactorily, except the corners. The boards on the inside were unplaned, and that is where I think I missed it; I shall probably have to put on a third thickness of boards, and

planed boards up and down. I am satisfied that it pays, even for twelve head of stock.

MR. THOM.—Don't put the boards up and down, for the reason that if two boards are set up this way, you have a chimney that runs clear to the bottom of your silo, to let the air through the whole length of it. If you put it the other way, the only chance for the air to come in is at the top.

MR. KELLOGG.—Would you put in another thickness of paper before you put in that third lining of boards?

MR. SMITH.—I think, to make a sure thing, I would put in a thickness of paper, and then put cheap shingles laid six inches to the weather, the same as you do on the roof. Last year I built a silo with cheap cull boards outside and in, and then the shingles. It cost only half as much as common lumber. The ensilage kept as perfectly as in any other silo I ever saw.

CAP'T. ENOS.—I would like to hear what Mr. Hodson can tell us on the subject of uncut ensilage.

MR. HODSON.—There is one point I make against cutting ensilage corn. We don't cut ours, and there is less waste in the corners. In our silo you won't find three inches of waste, and the outside is perfect. When you fill with whole corn, the heat drives to the outside and comes up and keeps it sweet. Another thing: It is natural for a cow to chew her food, and it mixes better with her feed when she eats it. All scientific men tell us that if it is mixed thoroughly it helps digestion. The machinery of the cow's stomach is called on, having this stringy stuff in it. Everything that is swallowed passes into the first stomach, and there is somewhat of a sifting process. If she takes her food cut, more particles pass through unchanged than if it is fed to her uncut. We have tried repeated experiments, changed cows back and forth, and we find they always produce the most on uncut feed. I have noticed in killing cattle that if we feed corn-meal, say, and mix it with uncut food, it is thoroughly mixed in the ruminant, and you will find pieces two inches long in the manifold; if you kill that cow six hours after she is fed, you will find the food pretty well sifted out. The cow needs to have long, fibrous feed so as to sift it finer. I find also a great difference in the droppings of cattle. I have found corn-stalks in the cow's fourth stomach an inch long, and hay also. We have proved to our satisfaction that the large corn is not the corn for our cows; we must have the small corn. We tried the cows last year back and forth, and they would come back to the small corn every time. I am satisfied I can get net profits of forty to fifty cents a ton more in uncut corn than in cut.

MR. THOM.—Do you have to carry it in your arms to the cows?

CAP'T. ENOS.—They carry it by railroads. They do things by clock-work over there.

MR. HODSON.—I told at the institute last year that we could take whole ensilage out of the silo and feed to 27 cows inside of seven minutes.

MR. SHERMAN.—I wish Cap't. Enos would tell us the cost of the contrivance by which Mr. Hodson feeds his cattle so nicely.

CAP'T. ENOS.—I thing it may cost about $25. Mr. Hodson built his all himself. There is an alley between the two rows of cows about three and a half or four feet wide, and about forty feet long. At one end of the alley is the silo. The door of the silo opens right in front of the alley. He has built an elevated railroad, or rather he has taken barn door wheels and built a platform

that runs right along within three or four inches of the floor, and right up against the door of his silo. He takes his ensilage and loads it upon that platform, and when he has enough to feed his stock, he starts off, and as he goes along throws it to the cattle on either side till he gets to the other end, forty feet away, and the cattle are fed. I haven't any doubt at all that Mr. Hodson can feed his herd of twenty-seven head of cattle in seven minutes, and not hustle around very rapidly either. It is one of the most ingenious and nicely arranged stables that I ever saw. He waters his stock on the same principle. He runs the water right in front of each row of cattle, so that his stock is watered and fed in about ten minutes.

MR. GORDON.—I would like to advise anybody who thinks of putting in an overhead railroad to feed cattle not to go to the regular dealers, makers of packing house railroads. I have one hundred and thirty-five feet of overhead railroad track. I found that it would have cost me about $225 to have that work put up, if I put it into the hands of the packer people, but by putting an iron wagon tire on the end, with couplings made at the blacksmith's shop, having my bails made at the blacksmith's shop, I got my one hundred and thirty-five feet of railroad track, to feed the entire herd and take care of all the traffic in the barn, for forty-five dollars. I believe now I shall put in two tracks behind, to cross so as to carry the manure out of the barn and dump it, and I believe the two tracks for the manure with crossings, &c., can be put in at forty dollars. On my track a child can push a car that is full of ensilage to feed fifty head of cattle. I believe it is a great saving of labor; I believe one man can feed one hundred cattle in less time than three men can otherwise.

## THE PROFITS OF DAIRY FARMING.

### By S. A. GERNON, Waukesha County, Wis.

**Dairymen Should be More Exact.**—In this time of depression in all branches of trade, when profits are very small in all kinds of business, even when large amounts of capital are invested, when competition is so brisk that there seems to be an overproduction of almost everything, the question naturally arises as to whether there is any profit in dairying, and if so, what are some of the methods necessary for dairymen to pursue in order to secure it?

The trouble with two-thirds of our dairymen is that they do not know what the income from their cows is, neither do they have any idea of the yearly cost of keeping a cow. They seem to think that all they have to do is to labor hard sixteen hours out of twenty-four, and trust in Providence to make the balance come out on the right side of the sheet at the close of the year, a task which she seems utterly unable or unwilling to perform.

**To Whom Failures are Due.**—It is the fashion now-a-days to lay nearly all

failures in dairying to the scrub cow, and doubtless she deserves nearly all the abuse she gets; but I think far more of the failures can be traced to the scrub man who feeds and cares for her. The best dairy herd in this county would soon degenerate into scrubs if they were fed scrub rations by a scrub dairyman.

The Successful Dairyman — Must know how to select and breed good cows; he must also know how to feed, handle and intelligently care for them. If he is manufacturing the product himself, he must know how to produce a first-class article and be salesman enough to find a first-class market for it. His maternal ancestor may have made the best butter he ever ate, and the best keeping butter; but he must remember that times and tastes change, and he will do well to keep up with the times and try to tickle the palate of the man he sells to. He must know how to produce the largest amount of good, nutritious food on the smallest amount of land, and how to preserve it in the best and most economical manner. As he cannot produce all the different kinds of feed he will require, he must know when, where and how to buy the balance.

Of one thing he need have no fear, and that is the loss of fertility of his farm if the manure from his cows is properly saved and applied; and as time passes I think he will not find this to be one of the least of the items of profit.

Profit and Loss in Dairying.— While there is a profit for some dairymen, many are making sad failures. In a series of papers written for Hoard's Dairyman, by C. W. Jennings, entitled a "Cow Census," giving the statistics of the dairy business of the town of Ellisburg, Jefferson County, N. Y., some light is thrown on this dark subject. Jefferson County is one of the oldest dairy counties in New York, and stands third in the State in regard to the number of cows kept. Following are some of the figures of this census:

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| Number dairymen interviewed | 367 |
| Number of cows kept | 5,507 |
| Average number cows per dairy | 15 |
| Lowest average gross earnings, herd of 10, per cow | $18.10 |
| Highest average gross earnings, herd of 5, per cow | $81.00 |
| Average gross earnings per cow | $31.74 |
| Average estimate of cost of keep per cow | $36.36 |
| Average loss per cow | $4.66 |
| Total loss on 5,507 cows | $24,480.00 |

Of the whole number of cows reported, 70 per cent. failed to bring in enough to pay for the cost of their keep, while of the remaining 30 per cent., 20 per cent. did not bring in enough over the cost of keep to pay their owners for the time spent in caring for them. This would leave 10 per cent. of all the cows kept in that township that were paying a net profit to their owners; or, while 10 men in every hundred were making a profit in dairying, 20 were just about holding their own, and 70 were losing money.

A curious fact shown by this census was that very little grain or mill-stuff was fed to these cows, and the ones who fed the smallest amounts of these feeds were *always* the ones showing the smallest incomes, and that where money *was* invested in this kind of feed, it was given back by the cows with interest at the rate of 500 per cent. This convinces me in this case that there were more scrub dairymen than scrub cows.

Dairying in Waukesha County.— Waukesha County, I think, can show more good dairymen to the square mile than that down east town. Let me give you a few figures as to what we are doing around here. First, let me give you a few conclusions arrived at by looking over the report of the Waukesha Butter and Cheese Factory for 1888. This factory paid out over $22,000 last year to its patrons, and now that it

seems to be established on a paying basis, there is no reason why it should not receive a much larger patronage.

I find that the average price paid by them for milk by the year was 93.3c. per cwt. The lowest average price paid was a fraction less than 80c per cwt.; the highest average price paid $1.086 per cwt. As each of these men received the same price per cwt. for the same months, there is a difference of nearly 29c. per cwt., by the year, in favor of the man who furnished the most milk when it was worth the most money, that is in winter, and I think we are wintering our cows now about as cheaply as we can carry them through our dry summers. This 29c. per cwt. can be set down in this case as one of the profits of dairy farming, and the reason why there was a profit was because there was something to sell when the market was not overstocked.

**Figures That do not Lie.**—A few figures telling what some of our individual dairymen are doing may be of interest. These figures give the gross earnings per cow for 1888. In each case the cow was credited with two dollars for value of calf. Where butter was made and cream sold, 20c. per cwt., was allowed as the feeding value of skim-milk. No allowance was made for whey where milk was taken to a cheese factory, because when a man sells a ton of milk off his farm he sells $2.43 worth of nitrogen, potash and phosphoric acid. When he manufactures the ton of milk into butter and sells that, he sells about three cents worth of these valuable fertilizers, and $2.46 per ton I think would be a big price for any whey I ever saw. Here are the figures:

| Dairy. | Cows. | Gross receipts per cow. | |
|---|---|---|---|
| 1 | 20 | $49.00 | Delivered milk to factory. |
| 2 | 18 | 49.66 | |
| 3 | 22 | 56.43 | |
| 4 | 16 | 69.87 | |
| 5 | 15 | 60.00 | Sold cream in Milwaukee. |
| 6 | 33 | 60.00 | |
| 7 | 19 | 68.00 | Made butter |
| 8 | 24 | 72.33 | |
| 9 | 20 | 74.80 | |
| 10 | 19 | 84.60 | |

Here are 10 dairies that average over 20 cows each. The average earnings per cow are $64.47. Most of these dairymen know very nearly the yearly cost of keeping a cow as they keep them. Taking an average of their figures, I think $35 per cow would be about the cost of feed for a year. Now, if we add $10 for the cost of caring for her for a year, then $45 is about the point where we may begin to figure the net profit. If these figures are nearly correct, then these 10 men have a net profit of nearly $20 per cow, not a very bad showing when we remember that 1888 was a very dry season with us.

We undoubtedly have dairymen with us who are realizing larger profits on their herds, where they are favorably located for retailing milk and cream, and, doubtless, others are doing better in butter and cheese production. Many, of course, are not doing as well as this, and some are working at a loss; but if they were as anxious to learn new and better ways as the successful ones are, they would soon have the balance on the right side of the ledger.

**The Secret of Success.**—What was the secret of the success of these dairymen? Having gone into the dairy business to make a success of it, as a business man would go into any other kind of business, they first selected their cows with a view to the kind of dairy work they wished to engage in. If butter making or cream production was the object they had in veiw, they selected cows that would produce large amounts of butter fat in their milk for the food consumed. If they were patrons of a cheese factory, they selected the cows that would give a large flow of milk regardless of quality.

This, of course, was not as it should be, but until some way is devised of paying for milk according to quality, the inducements held out to patrons are all for quantity. Having selected these cows for the object they had in view, they realized that, like a threshing machine, the more of the proper kind of feed they could run through them without clogging the sieves or impairing their digestion, the larger the profit would be, and as they did not select them in the first place with a view to profitable beef production, when they cease to yield a profit as milk producers they will not keep them long expecting to make a profit on 2c. beef.

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# DAIRYING AND BEEF PRODUCTION.

By C. R. BEACH, Whitewater, Wis.

**Beef Produced at a Loss.**—It has been so often demonstrated, both theoretically and practically, that dairying can be made to pay a handsome profit on capital invested, and labor performed, that I need not stop to show the way in which it can be done. But I think that it is claimed and generally admitted that but little if any beef is produced in Wisconsin, except at a loss, or, in other words, the food used for that purpose could have been sold or put to other use, and would have brought more money. Now the object of this paper is to attempt to point out a way by which, in connection with profitable dairying, beef can be produced at a profit.

**Selling Cows from the Dairy.**—As I am to work along the line and in harmony with successful dairying, I will start with the self-evident truth that the successful dairyman keeps no cows but those of good age. But he will find that all are not as good as the best, and he will think it for his interest to dispose of a certain number yearly and to replace them by purchase, or, what will perhaps be better, with heifers from his best cows. The usual course now pursued, is to sell those cows in the autumn or early winter for what they will bring, usually from 1½c. to 2c. per pound. One day in the early part of the present winter I saw three good sized cows, not very old, sold for $25. Two sold for $8 each, and one for $9. I remarked that the price seemed small. The answer was "it is, but they will eat their heads off before spring, and I had better sell them."

Was there a better way by which one could have kept those cows and fed them until they were good beef, and made money on the feed they would have eaten? I unhesitatingly answer, yes. It would have required a little fine thought and planning, but so does any successful work. We do not stumble into to the best way of doing things; we have to do lots of hard thinking to "get there."

**Feeding For Milk and Beef.**—As these instititues are designed to impart knowledge that has come to us through pratice, rather than that which has been deduced through theoretic specula-

tion, perhaps I can not enforce what I wish to say better than to relate a little of my experience: For several years previous to 1872 I was engaged almost exclusively in feeding cattle for beef. A part of the time I fed heifers and dry cows, and almost invariably found that they would put on more flesh on a given amount of feed than steers, and generally yield a better profit.

In the winter of 1871, during the month of February, I purchased 20 farrow cows that were then giving milk at a cost of $30 per head. I milked them until I had sold $100 worth of butter. They were then dried, and fed for beef, until grass grew, when they were turned to pasture without grain, and about the 20th of June were sold as beef to ship to Chicago for $55 per head, or $1,100, making $600 for the feed. I then thought I would buy my cows in the summer, send my milk to a cheese-factory, and feed the cows for beef during the winter.

In July I bought 20 cows, at a cost of $31.70 per head, and milked them, sending to a factory that closed the first of December. As the cows were giving a large flow of milk, I thought I would make a little butter before drying them. I made a couple of jars, and sent to a hotel in Chicago, for which I received 31c. per pound with an offer that if I would furnish them a hundred pounds a week for a year they would pay me 32c. per pound. In the place of drying my cows, as I intended, I arranged my cellar for keeping milk, and milked those cows all winter and spring, then selling them for beef at an average of about $40 per head.

I continued to furnish these parties with butter by the year, buying my cows fresh in the spring, keeping them farrow, milking, feeding, and selling for beef the following spring. In the spring of 1875 my books showed that, during these three years, I had purchased 79 cows at an average cost of $31.59, which had been sold for $40.41. The experience of these three years convinced me that I could milk cows and make beef at the same time. As times changed, and it became more difficult to buy good cows, and beef sold at less price, I of course have deviated somewhat from the original plan, but have never entirely abandoned it.

If I find in the spring of the year that I have cows that had better not be kept, or have more than I wish to keep, they are kept farrow and milked until the next spring. Then they are sold for beef, sometimes drying and turning to grass, and sometimes selling from the yard, before drying. The prices received have almost invariably been more satisfactory than to have sold them the previous fall.

**Figures That Show a Profit.**—Let us look at this matter a little more in detail. The cow that comes in milk in the spring and is milked to the 1st of December, weighing 900 to 1,000 pounds, would not, the last two or three years, have brought over 2c. per pound for shipping, and often less. If, now, a lot of such cows be fed daily from that time until the 10th day of May, 40 pounds of field-corn ensilage, worth 5c., with 10 pounds of wheat bran, worth 6c., and 10 pounds of good hay, worth 3c., making a daily ration worth 14c. (there are other rations equally as good, but I have mentioned this because I used it last winter and this, and know that it is both cheap and good), they will give from 12 to 20 pounds of milk per day, averaging 16 pounds, which will be worth from $1 to $1.50 per hundred, averaging $1.25, making the 16 pounds of milk worth 20c. daily, or 7c. above the cost of the rations. The manure

will pay for the work, and you have for the 160 days' feeding $11.20 above cost. If, now, these cows be dried, turned to pasture, and fed five pounds of corn meal until the 20th of June—40 days—at a cost of $1.80 for pasture and $1.20 for grain, the expense will be $3. Deduct this from the $11.20 profit on milk, and you will have $8.20 as the average amount they will have payed, *above their keeping*, out of their milk. At this particular time of the year the winter-fed cattle will be out of the market, grass beef not yet ready, and your cows will therefore sell well and bring at home 3c. to 4c. per pound, live weight, averaging 3½c.; they will have each added a hundred pounds or more to their original weight (I have in several instances had a whole car-load of cows add 80 pounds each by running 40 days on pasture), without grain, and will therefore bring $35 to $38 per head, or $17 to $18 above what they would have sold for the 1st of December, which, add to the $8.20 profit on milk, and you have a net gain of $25 to $26 per cow.

You may think these figures fanciful and extravagant, but they are not, and it will not take your best cows to do it, either. We, in Wisconsin, dispose of not less than 100,000 cows annually, most of them going for canners, at less than 2c. per pound. Had these cows been handled as I have indicated, with the results as I have figured, there would be an annual gain of $2,600,000 to the wealth of the State.

Do not think I am trying to persuade you to slaughter your good cows, in order to get money. I am only trying to show how more money could be made out of those we do dispose of. Some of our teachers are continually teaching that one-half the cows in Wisconsin do not pay their keep, and they advise us to sell them and supply their place with better ones; but they do not tell us how. It would be almost wicked to sell them for dairy cows to those who do not know as much as we.

**Experience in England.**—In confirmation of what I have said, some twenty-five years ago Mr. Hosford, of England (as reported by Stewart in his work on feeding) made a specialty of purchasing cows under six years old, feeding them for beef and milking them at the same time. In this way he could, in 6 or 8 months, increase their selling value for meat something like 50 per cent., and at the same time realize a handsome profit above cost of feed out of their milk. He fed six cows 191 days at a cost of 27c. a day each, amounting to $311. They averaged 35⅛ pounds of milk per day, which brought $1.44 per hundred pounds, amounting to $592, leaving a profit of $281, or $46.83 per cow on the milk alone, besides their increased value for beef. They had added to their live weight 84 pounds each.

**Skim-Milk and Whey**—I wish now to ask your attention for a short time while I attempt to show how we can utlize with *profit* the skim-milk, and the *whey* from our dairies in producing beef.

There are three reasons why we fail in our attempts at profitable beef production. We spoil our calves during the first three months of their lives. We attempt to put too much weight on the same animal, and we take too much time. The spring calf fed a few days on new milk and then changed to cold skimmed milk, and after a few weeks turned to grass and fed only sour milk until weaned, at three mouths old, will be worth but little to grow, and to convert into beef at *any age*. You can raise a spring calf that will be a good one, but he should never have green grass and sour milk at the same time, and I doubt the

advisability of giving him any grass for the first six months of his life.

One of my neighbors in New York State, more than thirty years ago, raised twenty spring calves, that were kept in the stable all summer and fed on hay, bran and oats, the sour milk, and the butter-milk, together with a gruel made by soaking oil cake in cold water. They were sold at about six months old and brought twenty dollars each, and were supposed to weigh about 500 pounds.

**Advantages of Early Maturity**—Were we to plan to have our steers ripe for the market at fourteen or sixteen months old, and weigh one thousand to twelve hundred pounds, instead of keeping them until they are thirty or thirty-six months old, and weigh from twelve hundred to fifteen hundred pounds, our chances of making a profit would be greater. We have learned that the pig may be made to pay a profit, if mature at eight months old, but will generally run his owner in debt if fed eighteen months. Why will not this law of early maturity hold good in making beef?

**Feeding a Calf for Profitable Beef.**—1. I will not choose a spring calf, because for the first six months of his life I propose to feed him largely on skim-milk and whey, and from May to October it is very difficult to have these two articles sweet, and if they become sour they lose much of their feeding value.

2. Because at the age when he needs the most care I am most busy with farm work, therefore shall be apt to neglect him.

3. As he is to be raised without grass while fed milk or whey, he will not get much exercise the first summer, and the same will be true of the winter following. This close confinement for a whole year will prevent a healthy development of bone and muscle.

4. I propose to sell him at fourteen or sixteen months, and this time in the care of the spring calf will fall in the summer when prices are generally at the lowest.

5. As profitable dairying is one of the conditions to accompany profitable beef production, and that generally means winter dairying, I prefer that the calf should be dropped the last half of September or the first half of October. This calf will then have time to grow to a size that will enable him better to withstand the extreme cold of winter.

Having thus settled that our calf should be a fall calf, and that we are to have him ready for the market in fourteen or sixteen months, what and how are we to feed and how handle him?

The first sixty days of a calf's life are most important. If neglected or mismanaged then, he will rarely recover. Governor Hoard, at the Janesville institute, named four conditions that he considered absolutely essential to success. The food should be sweet; it should be fed warm and often, and the calf should be kept dry. I most heartily indorse what he said.

For the the first ten days the calf should have new milk. Skim-milk may then be substituted, feeding from two to three times a day, the milk to be sweet and warm. We often injure calves by feeding too much at a time. After a few days ground flaxseed may be added to the milk. At five or six weeks old the calf will begin to eat a little fine hay, which should be kept within reach, and soon will lick a little wheat bran, and at two months will eat whole oats. If you have carried him up to this time in good shape, the critical period is past. After this, the milk can be gradually lessened, but to produce the best results it should be kept up until the calf goes to grass in the

spring. After the calf begins to eat hay and grain, he should have water daily.

**Cost of Keeping.**— Let us now try and determine what this calf should cost for keeping from the middle of October to grass time, 200 days. His food will, of course, be varied in kind and amount, but we will allow the following for an average daily ration:

| | |
|---|---|
| 12 lbs. of milk, 200 days, 2,400 lbs., at 25c | $6 00 |
| 1 lb. of oats, 200 days, 200 lbs., at 1c | 2.00 |
| 2 lbs. of bran, 200 days, 400 lbs. | 2.40 |
| 1 lb. of oil meal, 200 days, 200 lbs | 2.50 |
| 1 lb. of hay, 200 days, 200 lbs. | 0.60 |
| Total cost | $13.50 |

He will weigh from 400 to 500 pounds, at a cost of not exceeding 3c. per pound. As the whey of our cheese factories can be kept comparatively sweet in winter, it can be used in place of milk by increasing the oil meal, or, what is better, flax-seed gruel.

The calf that has cost us $13.50 up to grass, can now be turned to pasture and fed two pounds oats and two pounds wheat bran daily for 100 days, or up to the first of September. At 20c. per week for pasture and the grain at cost, your calf has cost you $18, and should weigh from 700 to 800 pounds. From the first of September to January, you may feed him anything that he will eat that will make him take on flesh the fastest—grass, fodder corn, shocked corn, run through a cutter, ensilage corn, ground oats and wheat bran. The flies are away, and you can make him grow wonderfully; you ought, in these 120 days, to make him put on from 300 to 400 pounds. Prof. Henry reports that he made a lot of steers, fed on corn ensilage alone, put on 3 7-10 pounds daily for twenty-six days in succession. A lot of 30 1,000-pound steers that I wintered in the winter of 1884, the following summer added 300 pounds in 100 days on pasture grass alone. The cost of the feed for this steer for the last 120 days ought not to exceed 10c. per day; he is on grass for more than half the time, making the entire cost $30, and if he weighs 900 pounds and sells for but 4c., he will bring $36, and if he weighs 1000 lbs. he will bring you $40 or more. Success in this plan depends upon starting at the right time of the year, utilizing your waste dairy products. Make your calf do his best every day he lives, and sell him before he eats his head off.

**Utilizing Whey.**— This utilizing whey, feeding it at the time of year it can best be kept sweet, is deserving of more than a passing consideration. Sweet whey contains over 6½ pounds of dry solubles in each hundred pounds, more than half as much as new milk. If we could feed all the whey made in Wisconsin while it is sweet, it would amount to a good many hundred thousand dollars more than we now get out of it.

In proof of the value of whey for calves, Mr. I. H. Wanzer, of Elgin, in 1876, fed 120 calves whey, oil-meal, oats and bran. They were fed milk four weeks, and were sold at seven months old at an average of about $21 (E. W. Stewart is my authority).

**Skim-Milk and Whey for Hogs.**— While skim-milk and whey make excellent feed for hogs, they yield better in returns fed in summer than in winter. By planning to raise winter calves, we could feed in the summer the pigs we ought to sell at eight months old; and then, in the place of raising fall pigs, to eat winter slops, we could feed the slops to calves with perhaps greater profit.

**Jersey Beef.**—How about Jersey beef? we know that it won the first place as to quality at the late fat stock show held at Chicago. It matures early,

and if it should be found that the neck of a Jersey steer made better beef than the sirloin of a Durham, perhaps he will pay for the feed he eats, if he don't weigh quite as many pounds.

50,000,000 lbs. of Beef a Year.—The people of Wisconsin consume from thirty to fifty million pounds of beef annually. We can not afford to import it, and one of the problems for Wisconsin farmers to solve is, how to make it the cheapest.

### Discussion.

MR. CLAPP.—You bought your cows for $31.70.

MR. BEACH.—I take the cow when the man wants to sell her in the fall. I am not taking her at the price I buy her for a dairy cow. I am talking about cows that you want to dispose of, and not the best cows which you are keeping.

MR. FAVILLE.—Have you sold any cows this spring?

MR. BEACH.—I have a carload that I shall sell.

MR. FAVILLE.—When you get four cents a pound for them, let us know.

MR. BEACH.—Last year my cows brought me over three dollars, without drying, before they went out of the yard; if I had dried them, would have got a cent more.

MR. FAVILLE.—I have tried that plan of feeding cows, and I didn't make any money by it.

MR. SHERMAN.—Is it pratical to feed old, full-blooded Jersey cows?

MR. BEACH.—Dairymen don't keep cows so long; they can't use them.

PROF. HENRY.—My students in agriculture are going over figures in regard to some work in feeding at the Station. We are feeding several calves, keep an account of what each one eats, and at the end of about twelve weeks feeding, when the calf was about thirteen to eighteen weeks old, we went over several of the reports, and found that the calves were then taking twenty pounds of sweet skim-milk a day. They were eating ten ounces of oats a day; the hay was so small a quantity that we could hardly weigh it. Now, upon that twenty pounds of sweet skim-milk and ten ounces of oats daily, the calves are gaining from one and one-tenth to one and seven-tenths pounds. We are getting an average of one and four-tenths gain a day for the lot, by feeding that way. Those are grade Jersey calves.

MR. BEACH.—I hope no one will get the impression that I advised giving up dairying, and going into what cows one can find; but, if you are dairying profitably, you must sort out your cows, and I am merely trying to show you how you can make the best possible use of them. Most people raise their cows, and they wish to dispose of those that are the furthest advanced and the most unsatisfactory. We don't buy cows to sell again, if we are dairymen.

CAPTAIN ENOS.—My experience in the dairy business is this: When I had a heifer or a young cow, and when I came to feed high with a view of testing that animal to see whether I should retain it in the dairy or dispose of it, that question was settled by this fact: If the animal put on fat instead of making returns in response to what it was fed, in butter and the pail, that animal was to be disposed of at any price. I went upon the principle of the survival of the fittest in building up a dairy herd, and I long ago discovered that as soon as a young cow began to put on fat in response to her high feeding that she was not the cow for the dairy, at least not for my dairy. When I found a cow that kept her condition fair, and frequently would grow thinner in flesh,

that was the better cow for me. Whenever a heifer or a cow was ready to turn off, I did not ask the question, how much I could realize from that creature. I figured up that if she had been in milk for six or seven years she had earned for me from twenty-five to thirty per cent. net profit every day, and I came to the conclusion that that animal must go for whatever the butcher offered me.

MR. BEACH.—That is precisely what I propose—to get them ready for the butcher and sell them to him. We agree.

The following resolution, offered by Mr. Gernon, was adopted.

*Resolved*—By the farmers assembled in convention at Waukesha, that we most urgently request our legislators at Madison to take immediate steps to drive all fraudulent imitations of butter and cheese from the State.

*Resolved*—That we urge the establishment of a food and dairy commission to aid in this work.

# ADVANTAGES OF THE CREAMERY SYSTEM.

By A. R. HOARD, Ft. Atkinson, Wis.

**The Farmer a Producer.**—The farmer proper is a producer, and in this age of specialities, the special producer of milk and cream will certainly have an advantage over him who spends half his time in manufacturing and finding a market for his product that only the other half of his time has produced. I have noticed that when a dairyman who has been making butter for years starts in to send his milk to the creamery, he increases his herd of cows. He becomes especially a producer of milk. He wants to send all the milk the farm will produce to the creamery; and, devoting his whole time to that end, he is better able to do it. A dairyman may be able to make just as good butter as any creamery turns out, but he must have the necessary appliances and skill to do it, and in order to make these requirements profitable, he should make up the butter for the neighborhood. It takes just as much skill and time to make 10 lbs. of butter as it does to make 100 lbs., and the latter will sell for a higher price per pound, as the dealer who buys it will see ten times the profit in the larger lot.

**Increases the Value of Land.**—There is another advantage which a good creamery brings to every farmer in the neighborhood of its location. It increases the value of his land. This advantage is enjoyed by all, whether they patronize the creamery or make up their butter on their farms, so long as the creamery makes good dividends to its patrons. A few individuals may have the conveniences, skill and time to make fine butter, and get full Elgin prices for it. They think it will make but little difference to them whether the creamery runs or "busts up," as the saying goes, for want of patronage. I think they are mistaken. The great majority of farmers are not situated as they are. They have not the conveniences, time, skill or ability to make first-class butter. Should the creamery close, three-fourths

of the milk that went to it would be made up and sold to the grocery as store butter, at a great sacrifice in price. All around you dairying is unprofitable, cows are being kept at a loss. Your neighbors are hard up, and the mortgages on their farms are growing larger. Time goes on. You have milked cows and fought the witches in the cream so long that you think you will sell out, leave the farm and move into town. Now comes your disadvantages for the lack of the creamery system. Land is cheap. A hundred men want to sell to one who wants to buy; but this has not been your first trouble. The creamery system has been abolished and so much poor butter has been made that consumption has not been equal to the supply. Every pound of poor butter fills the place of two pounds of good, and you find the market badly over-stocked, a condition that affects all grades in price.

Decreases Bad Butter. — Another point: Were the creameries to go out of existence to-day, oleomargarine, the dairyman's worst enemy, would gain a great point, and the manufacture of it would be doubled many times. What the dairyman needs is a greater consumption to maintain and stimulate prices, and creamery butter has done a great deal to increase consumption, because it has decreased the production of bad butter. It will bear the trial of hot cakes favorably, and everybody knows how fast they go.

Dairy Butter is not Uniform.—As I have said before, I believe it possible for a dairyman to make just as fine butter as any creamery; but where it is not the special business of the farmer, it often becomes too much of a secondary effort. If the ladies make the butter, visitors take up most of the time; and a woman who would not stop a churn to receive callers, or make a cake for her table, in consequence of unexpected company, or the like; who wouldn't put off churning on Monday, when the cream was ready, in order to get her washing out, and a hundred other household duties, "just would not have any home at all"—"might just as well live in a creamery." And yet all this makes an uneven grade of butter. Scarcely two churnings are alike, and a regular customer who pays the higest prices demands these conditions, and unless there is a quantity sufficient to make a business of it, it will not pay for the time and trouble it costs.

50,000,000 lbs. of Butter.—Wisconsin produced in 1888 over 50,000,000 lbs. of butter. The average price received for this butter was 16 cts. per lb., if we judge by the value given in the census of 1885. Fully 40,000,000 lbs. of that butter was produced on the farm. The average price of the general run of creamery butter was about 23 cts. Here is a difference of 7 cts. per lb., or, in the aggregate, $3,500,000 which the farmers and the State lost by trying to make the butter on the farm.

Creamerymen as Salesmen. — Many farmers are unfitted by education or contact with the world to make a success as merchants. To get good remunerative prices one must make a study of the markets, and invent ways of reaching the highest priced customers. To do this successfully, one must keep points constantly in mind. Hence it is that creamerymen are more successful as marketmen. The tendency of farm life is to shut a man up between his own line fences, and, as St. Paul says, "measure himself by himself." That kind of measuring keeps a man in ignorance of the kind of man or butter-maker he is. He takes his butter to a country store and swaps it off, and never secures a

particle of market education, because he is not selling in a butter market.

**Special Dairy Education.**—Besides all this, it takes a special dairy education to make the kind of butter that will command the best market prices. This kind of education the farmer is very loth to give himself. Nine pounds out of ten of the milk that produced the great mass of sixteen-cent butter would have made twenty-five-cent butter, providing it could have been taken away from the farmer as soon as drawn from the cow, and subjected to first-class creamery conditions. Hence the great advantage to the farmer of the creamery. The great mass of farmers who keep cows are not dairymen. They do not consider that they need to know any more about the principles of dairying than they did when they were doing nothing but growing wheat. Left to themselves, they make but little improvement. Something needs to be done to make them rub against one another, and thus show up their deficiencies. That something is a creamery. The moment it comes to a neighborhood every man who patronizes it is put into comparison with his neighbor. That stimulates him to increase his product. Thus the creamery becomes the center of dairy education for the little knot of men who are its patrons. The farmers need dairy education sadly. The lack of it is the great reason why they do not make more money out of their cows. There are thousands of new and valuable ideas that the well-posted dairyman has, that the average farmer knows nothing about. As long as he stays an average farmer, he will keep in that state. Make a creamery patron of him and the same man changes. He is in a current. If he does not get more and better knowledge out of it, he alone is to blame.

**The Subject in a Nut-Shell.**—Some one has put this subject in a nut-shell, when he said: "Within a circuit containing a hundred farms, 100 women empty 100 cream jars into 100 churns at 100 different temperatures, and 100 witches in the cream try the patience of 100 over-worked women and make 100 samples of 100 grades of butter, to be sold to 100 merchants at 100 prices, and what does it all amount to? One good butter-maker, by taking the milk or cream produced by the 100 farms, will turn out more and better butter of one even grade or quality at a much higher price, with more profit and less labor on the farms."

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**Discussion.**

MR. MONRAD.—How long a distance do you consider it practical to haul the milk here in Wisconsin?

MR. HOARD.—I think in a dairy section the cows ought to be thick enough to make the hauling a shorter distance then they generally have to do it. I have milk that comes six miles. It is hauled by way of routes. One farmer living at the other end of the route hauls a load, picking up on the way, and takes whey back. I suppose, practically, it might be hauled a good deal further in one case than another; according to the care it receives, the kind of wagon, etc.—under the best of conditions, I should say not over six or seven miles.

MR. VAN DUZEN.—I want to endorse the statement of Mr. Hoard that farmers and dairymen learn a great deal from the creameries when they are first introduced among them. When I commenced running a creamery, about eighteen or twenty years ago, I found that the dairymen who patronized it did not want to have their cows in milk until about the first of May, and wanted them to dry up in October. After they

had had the experience of a year or two, they were willing to change that—to have their cows in milk about the first of April and keep them running right up to the first of December. It is of great advantage to them to have such an institution start among them. They have the figures right before them, they know what they are getting, and they find why their neighbors are doing better than they are, and in this way learn a great deal.

MR. HOARD.—While they are waiting for the skim-milk, from fifteen minutes to an hour, as they have to do when they want the milk sweet for their calves, there is a regular farmers' institute held every morning; they exchange ideas, compare notes, yields, etc.

MR. THOM.—Mr. Hoard, what is the relative value of milk from the separator and ordinary skim-milk for feeding purposes?

MR. HOARD.—I don't know that I can answer that question, not having fed both kinds. I have fed skim-milk from the separator. I have made experiments in feeding sour skim-milk with butter-milk, about two-thirds of the former to one-third of the latter, and the lowest that I ever made it pay was twenty-two and a half cents a hundred. In that experiment I bought fourteen hogs, weighing about one hundred and forty-five pounds apiece, and kept them twenty-six days, and they gained over two pounds a day apiece. They got a pail of sour skim-milk and buttermilk, mixed, in the morning, and another pail in the afternoon. All the corn I fed them was an ear apiece. Of course, I think it would be more profitable to feed some corn with it, but I was after the experiment of finding out what I could do on skim-milk alone.

MR. FARGO.—Do you receive your milk by a test system, or do you distribute to your patrons according to the number of pounds of milk?

MR. HOARD.—We have a test system, but we don't pay for the milk on that basis.

MR. FARGO.—Is the quality of the milk improved, that is, does it grow better as you continue in the use of the test or does it grow poorer and do you get more milk one year after the other?

MR. HOARD.—This winter the milk has been very poor, but I find that is true with other people also; I don't know the cause unless it is the warmer winter and the cows drinking a good deal of water, the milk being thinned in that way. One generally notices when we have a very cold day, that it will ke less milk than the next day to make a pound of butter.

MR. THOM.—I think it is very clearly demonstrated that the more water the cow drinks, the better the quality of the milk.

MR. HOARD.—I don't believe it. I have figured my yield every day for the last three years. I know just how many pounds of milk it takes to make a pound of butter, and after a week of very cold weather—twenty below zero—we will make a pound of butter, say from nineteen and a half to twenty pounds of milk, when in summer weather it will take a pound or so more. We run what is called the Jersey vat. All the milk in that vat is from cows coming in in the fall. When we begin to put in the new milk in the spring, it reduces the richness.

MR. BEACH.—I wish Mr. Thom would tell us how pure water will make richer milk?

MR. THOM.—I am not much of a chemist, but I have heard that if a cow drinks pure water her food is better assimilated. The falling away in the cold weather in the quantity is not due to the

fact that she drinks less water, but that she eats more solid matter. I think water is greatly under-rated in its feeding value. There is good feeding value in turnips, for instance, and yet there is a great deal of water in them.

MR. GORDON.—What is your rule for admitting to the Jersey vat, Mr Hoard?

MR. HOARD.—We have in reality two factories in one. The milk of any patron who has fifty per cent. Jersey or Guernsey blood in his herd goes into what we call the Jersey vat. It is run through the separator by itself and churned by itself. By fifty per cent. Jersey blood in the herd, we mean half-and-half; for instance, one full-blood would take in a native in the herd making the two average fifty per cent.

QUESTION.—Does the Jersey vat butter sell for any more than the other butter?

MR. HOARD.—We do not admit that we cannot make first-class butter out of common milk. In the fall of the year I know that the Jersey butter is much the best. In the spring, I think the other is best, but that is owing to the difference in the time of the cows coming in.

QUESTION.—How much does your pool pay for the Jersey vat?

MR. HOARD.—It averaged last year about ten per cent.

QUESTION.—Do you realize any more at the factory from that class of butter than from the other?

MR. HOARD.—I do not, but there is more butter in the 100 pounds of milk, about ten per cent.

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# ADVANTAGES OF CHEESE PRODUCTION.

By T. J. FLEMING, Watertown, Wis.

**Our Strongest Competition** -- In my opinion, our strongest competition arises rather from a lack of quality than from surplus or quantity. I believe, and have maintained, that if the quality of our cheese were to increase 50 per cent., the consumption of the same would be proportionally increased. If this is true, is there not at our finger's end a remedy for this supposed overproduction? But what is the best and most opportune expedient to establish? Primary and principal comes the creation of a Dairy Commissioner, whose duty shall be to enforce all laws now existing, or which may hereafter be enacted, in this State, relative to the production, manufacture and sale of dairy products. [A law was passed by the legislature last winter establishing a Dairy and Food Commission, and Mr. H. C. Thom, of Beloit, has been appointed Dairy and Food Commissioner. —ED.] He should also advise, if not prohibit, the manufacture of skim cheese and the marketing of green, uncured or premature goods. I believe right here is one of the greatest inconsistencies of our advanced business ideas. It is a lamentable fact that, while we may succeed in getting a small portion of our uncured product upon the earliest and best market, we are doing it at a decided loss to the bulk of our product. Why? Simply and wholly because the immature cheese

is not marketable, edible or digestible, and the fact of its being held in stock by the commission-men, with their very imperfect facilities, tends to deteriorate quality instead of improving it with age. What is the result? Simply that this inferior stock continues accumulating until the commission-men become fearful of the results, and dispose of it at a sacrifice, thereby establishing a price, to a certain extent, by which our better goods are disposed of. This illy-advised practice begets a spirit of dissatisfaction and distrust, and so disarranges the whole business.

**Summer Dairying.**—There is another detrimental practice to this industry, viz., exclusive summer manufacturing; for is it not a fact that our maximum product is made at a time of minimum value. I should like to know if there is any industry in this, or any other country, which can long withstand and flourish under such inconsistances.

**To Obtain Best Results.**—Thus far I have touched rather upon the disadvantages than the advantages of cheese-making. The advantages and best possible results of cheese-making are obtainable only under the cleanliest care of milk and most skillful manipulation of the same. There should be harmonious co-operation of the cow, the owner and the manufacturer. This will, doubtless, seem overdrawn, but disarrange the unison of these and you will be disappointed with the result. Milk intended for the cheese factory should be taken from cows having free access to salt, spring water and abundance of succulent food; and far removed from stagnant pools and decomposed vegetable or animal matter. These have the power of imparting disagreeable and hurtful effects to the milk being elaborated in the cow's system.

**Care of Milk.**—Now that nature and proper surroundings have produced pure and untainted milk, let the owner be true to his trust, and remove at once from all contaminating influences. This milk should be strained at once, and thoroughly aerated before cooling sets in. The object of this is two-fold—it removes animal and other odors, and retards creaming in the milk, both of which are very essential to cheese-making. In transporting milk to a factory, the morning's milk should not be mixed with the evening's, but if unavoidable, never be of a higher temperature. If the patronage is to a factory where milk is received but once a day, the temperature of the night's milk should be lowered to about 65°, and then removed from the water in which it was cooled, never permitting it to remain in water over night. Milk handled in this way, and coming from cows having free access to salt, will go to the factory in a much better condition than if these points are considered non-essential, and overlooked.

**The Manufacturer's Duty.**—If these few suggestions are rigidly followed, the manufacture of a first-class article rests wholly with the manufacturer's skill and knowledge in handling that milk. He should aim (after having studied the conditions of the milk) to incorporate the whole of the cream with the caseine in the coagulated form. This cannot be done by the prevalent manipulation. This cream which has risen upon the milk held over night becomes, to a certain extent, a separate and floating body, and not within the coagulating power of the rennet necessary for the coagulation of normal milk. In this way, people are often disappointed with the quality and quantity of their cheese product, and very justly so, for they are virtually making a skim cheese, though, at the same time, evading the

penalty. What then is the remedy? Cheese the milk twice a day, as I do—or reduce this cream to a more liquid or soluble condition by repeated strainings at the factory, or, better, by the application of pure water, at a temperature of 125° to this already risen cream, and then mix the whole mass together, add the rennet and stir constantly but not vigorously for fifteen minutes. Follow this plan and I will warrant that you will be most agreeably surprised.

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# FARMING TO A PURPOSE OR AT CROSS-PURPOSES.

**By HON. HIRAM SMITH, Sheboygan Falls, Wis.**

**Does Farming Pay?**—There has been a great deal said about the different branches of farming. Some have complained that dairying does not pay, others that sheep husbandry does not pay—the competition is so sharp on high-priced land that they are unable to meet it. The same is true of beef and pork, and so on through the whole list, and according to the reports, it looks as if the only thing to do is for the farming community to get out of all as soon as possible. But we should remember this can't be done; we can't get out of farming. We are in it, and in it to stay.

**Unfitted for Other Business.**— We are unfitted for other business, and other business is not open to us. If we attempted to go in and compete with people in other branches of business, we would find worse competition than we do now on the farm. We should find the professions over-crowded. Therefore, we must make the best of the situation in which we find ourselves placed, and if we turn our attention directly to this matter, we shall find that we are not so badly off, after all; that there is a chance that we shall be enabled to pursue our vocation with greater hope of success.

**Understanding Terms Used.**—In taking up the question of farming at cross-purposes, it is important that we understand the terms used, that we may understand the meaning of them alike. Most of the disputes that arise among men arise from not understanding terms used in the same light. A certain gentleman was traveling in the State of Kentucky. He knew that to be the Bourbon State, and he expected to see a great deal of dissipation and drinking. He said to an old lady sitting in the same car: "People in your State, I suppose, are very bibulous people?" The old women said: "Indeed, stranger, you are mistaken, I don't think you can find a dozen bibles in this county

**Two Examples of Farming.**—Is there a good deal of farming at cross-purposes going on in this State? I was talking the other day with a farmer, the owner of four hundred acres of land. He had been engaged in making beef, and had just shipped his beef to Chicago, and sold three-year-old steers at $41 apiece, or $3.25 per hundred. He told

me it did not cover the cost of their feed—left him no wages, nothing for his invested capital. He had kept them on pasture grass in summer and hay in winter. He had been raising beef at cross-purposes.

Another man had "got onto" the new method. He had a large silo filled with corn, marketed his beef in August when it brought a high price, and made money. The trouble was not in the farm or the surroundings; it was a question of the man's capacity to see the situation and take advantage of it.

This same rule holds in all branches of agriculture. It is not the occupation, but the means employed to carry it forward. Therefore, such meetings as this are to remedy the evils which have sprung up through sloth and inadvertence among those engaged in the business. By a careful watching of the best means, finding out who has succeeded here and there, getting his experience, we can remedy many of the evils of which we have to complain.

**Hap-Hazard Methods.**—A man may try to raise high-priced trotters, or he may buy high-priced Jersey cows. If he has no knowledge of making butter or of properly taking care of his horses, he is pretty sure to fail. We see very many trying to raise Jersey cows, for instance. They come in so that the greatest flow of milk is in the summer, when milk is cheap. Along about August the pastures dry up; he has no silo, no adequate preparation for winter feeding, and has to sell out in the fall. He is farming at cross-purposes; has no well-defined method; has laid no plans by which he could carefully work out his salvation. He goes into things in a haphazard way, doing a little of this work and a little of that, and the result is usually that there is a loss. But if a person is farming to a purpose, he will confine himself to a special line and pursue that line with all the intelligence he can bring to bear upon it.

**Diversified Farming.**—We frequently hear, and always will hear it when politicians address an agricultural fair, of diversified farming, and of the general-purpose farmer, and that if he fails in one line he will hit upon another, endorsing the idea that there is no proper way to pursue but to take your chances on as many odd ends as you would if you were going to buy a lottery ticket. But I say if you will pursue a straight line, get all the information you possibly can, you will be a great deal more apt to succeed. We often hear the argument made that such a man has some capital, he has had some advantages and he may run a special branch of business and succeed with it while another can not. It seems to me, that that is as much as to say that a very smart man with some money can run one kind of business, but that a poor man who don't know much of anything can run four or five kinds of business.

**Special Farming.**—If we will take up special farming, it will be for our interest. We will take delight in learning all there is pertaining to that particular branch of business, and the sooner the people of Wisconsin can abandon the idea that it is at all necessary that a man should raise his own flour for bread, as they used to think they must do, raise the wool and prepare it to make the clothing, or trade it for clothing, and all that class of business, the better off they will be.

Let a man pursue one kind of business and pursue it to the best of his knowledge, and he is more likely to succeed than men who are working at cross-purposes.

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**Discussion.**

MR. PERKINS.—I have a farm partly adapted to sheep-raising and partly to

dairying. Shall I get rid of my sheep and keep the cows, or get rid of the cows and keep the sheep, or shall I keep both?

MR. SMITH.— I never give or take advice as to what another man shall do. He must judge of his own circumstances. I am here only to tell what I have done.

MR. ODELL.— Won't you give us some points regarding winter dairying?

MR. SMITH. — When I commenced dairying, in 1857, we held no method of farming but summer dairying. We had all been brought up to that. I had become disgusted with wheat-raising, concluded to adopt dairying, and commenced with making cheese in the summer. The cows were so few that we run up what we called a double-curd cheese. After the dairy became larger, we made cheese every day in the summer, making butter in the fall, and the cows went dry most of the time in winter. We pursued that method until we kept fifty cows on the farm, furnishing pasture grass in the summer, and hay, mainly, in the winter, raising a very little corn, fooling away time husking, shelling and grinding it, and giving it back to the cows in poorer condition than when we commenced to husk it. This is the way we pursued our work, with as little hired help as possible, for the receipts did not warrant a very extensive outlay for hired help. We worked along a good many years in that way. When the cold weather came on, the cows gave but very little milk, and the question came up whether they gave enough milk to pay to keep the hired men and board them. You know hired men are generally awful eaters. We would turn off the hired men and get along as we could. We tried to keep our dairy at a temperature of about sixty-two degrees, to raise the cream in pans. In the course of a cold spell often the cream didn't rise, at least we didn't think it rose because it was thick and leathery. Of course, we didn't know that the cream was below. We waited until it became thick, so as to take it off with the skimmer. As soon as we finished skimming we went to churning. A good deal of the cream was unripe, and it became a sort of a mulch. We didn't know it then, but we probably lost about thirty per cent. of the butter.

We went on in that way a good many years. Sometimes there would be two hundred pans to skim and wash up, and that would be a pretty big day's work for my wife, on the day we churned. It was a very laborious business. It required great strength and left us pretty tired. We didn't think of caring to read anything. If somebody had come in and told us some particularly good story that was just out, some good tale that William Black had written, we should not have known about it or cared; we would rather go to sleep than read. The consequence was that there was no opportunity to make any progress, and, more than all, there was no desire, because our tiresome work left us too fatigued.

We pursued that way for several years, and I will give you the results. The receipts on that farm with fifty cows, with a summer dairy (and they ate everything that grew on the farm, and all that the pork sold for to buy bran) were about $18.00 or $19.00 and that was more than a good many dairymen received, but it took nearly the whole of it to pay the hired help, and some little improvements constantly necessary.

At last, we changed over to winter dairying, and commenced a new kind of business. We became satisfied that it was better to sell the large flow of milk

that cows give in the course of a year, if that flow comes when butter is thirty, thirty-three and thirty-five cents a pound, than to be selling it when it is sixteen, eighteen, or twenty cents. Therefore, we resolved to engage in winter dairying, and after we had been at it a very short time, we saw that the cows gave more milk in the course of the year—giving even from 500 to 1,000 pounds more—by being milked as a winter dairy, than when milked as a summer dairy. The main reason was that they would naturally go dry after about seven or eight months, and if they came into fresh milk in September and October, the next summer when we had fresh grass either to cut for soiling or to pasture, the fresh feed kept up the flow of milk. There is where the gain came in.

Again, we found that we had more fodder left by always feeding in the stable — soiling to take the place of pasture grass. We found that about as much would grow on one acre, to cut and haul into the barn, as would, when the cattle ran over it and wasted and defiled and trod it down, on two acres of pasture grass. There are very few farmers who pasture cows, as a rule, on much less than three acres, while it is perfectly within limits to keep a cow on less than one acre. We find that the receipts for winter dairying, after it was fairly under way, have increased the price of the product that we made, and increased the number of cows that we kept by soiling, and by the use of the silo.

We found four years ago, by the use the silo, and the practice of soiling, that we could keep eighty or ninety milch cows and some young stock, and the receipts from the sales of the dairy product were about $4,200, leaving $1,800 to $2,000 net profit after paying for the hired help and all the expenses of the farm. There was more net profit left from the winter dairy than the entire receipts were eight years ago when we were running a summer dairy. That is my experience in the change I have made

MR. LINDSAY.—What do you feed for soiling your cows in summer?

MR. SMITH.—The first green feed we cut is winter rye, sowed in August and July previous. This is headed out and fit to cut about the 20th of May, in our section of the country. We use this ten days or two weeks, until the clover is large enough to cut. That begins to blossom about the 16th or 20th of June, and then we begin to cut, and cut the clover till it gets a little old, for fresh feed. We generally have a little millet at that time. Two or three acres of millet will feed eighty or ninety cows for a week or ten days. After the millet, then the second crop of clover is large enough, and that runs till the fodder corn is in the roasting stage. Then we begin and feed fodder corn and second crop clover, whichever is most convenient and easy to manage until winter, then open the silo and feed about forty-five pounds of ensilage per day, in two feeds, giving barley or oat straw, and a little ground feed upon it—what they will eat. We milk at five o'clock the year around, and every morning we give the cows one or two pounds of hay each, not to exceed two pounds, in any case. This we give mainly that the cows may all get up ready to be milked, and that is all the hay they get during the winter. When we changed to winter dairying, there was no sudden change in the kind of cows. They were the same, when I commenced, that I had before, but I always keep a full blood Jersey at the head of the herd, and they naturally improved in quality. Therefore, they

are constantly growing better for butter. The cows have improved a little in butter, and therefore, the yield is more than it would be otherwise.

MR. FAVILLE.—Are these increased receipts from your farm due entirely to changing from summer to winter dairying? Hasn't Hiram Smith's reputation something to do with it?

MR. SMITH.—I did not, in my remarks, attribute it entirely to winter dairying. I said the winter dairying, in connection with soiling cows in summer, and silo feed in winter. I think my increased receipts are entirely due to those three causes, added to what I said in regard to gradually improving the stock. My friend Faville thinks there is some necromancy about the man who sells butter—that one man can sell the butter higher than another, but my opinion is that it is not a question of reputation. My reputation for making butter might not last ten days. If I should send a poor quality of butter this week, before next week it would be all shipped back to me, and it ought to be. I can spoil my reputation in less than one week. Of course there are some people who have confidence that I will make good butter, but unless I continue to make that good butter, my reputation and my market are gone. You can't hold your market if you don't make good butter. If you do make good butter, you can get any market you go to.

MR. UTTER.—Did you use a grain ration with your rye?

MR. SMITH.—Yes, I always give a grain ration to each cow that gives milk, and generally if she don't give milk. Every day they have the value of no less than six pounds of bran or middlings, and I think it is the cheapest way to keep cows.

I wish to add that winter butter does not require any contract to sell it. I have shipped butter for the last four years, and made out the bill for two cents a pound less than I could get to send it to New York. Winter butter will always sell well. For the last four years I have shipped butter in sixty pound tubs to New York, through a commission house, and sold it in the butter market for thirty-three cents, and it cost about two cents a pound to get it there. A man with a winter dairy can take advantage of this, but if he has a summer dairy he has to do the best he can. The commission-men won't talk with him. They can't do him any good.

Another reason why this method of making butter is an improvement on the old, is that it removes all work from the house. It takes a young man to make the butter, and we hire a young man every year or two and teach him how. It is not a difficult thing to teach him to make butter. A bright young man can learn it in a week, but I would not undertake to teach a Yankee who had been in the business twenty years. It is a short job to teach it; it is governed by rules and directions which are as plain as those of any other business. It takes it out of the house into the dairy-house where it belongs, and it leaves the farmer in a much better condition, much more contented and happy, with a better opportunity to develop and find out what good there is in the world, instead of being overworked and bringing out the bad that is in him all the time.

MR. VAN DUZEN.—A gentleman wishes me to ask you, Mr. Smith, which you consider the best feed, ensilage and grain, such as you furnish your cows in the winter, or pasture?

MR. SMITH.—I think very much alike. I think good ensilage is just as good for

milk and butter as the best pasture. Of course, it requires grain feed in either case. A cow cannot make good milk from one kind of feed; there is not the material in it that constitutes the proper qualities for milk; but ensilage makes the best butter in winter feed I have ever tried—nice, sweet butter, full aroma, fresh, sweet flavor that men are willing to pay a high price for.

MR. VAN DUZEN.—The great objection to soiling is the amount of labor in getting the fresh cut grass to the cow. Now, why isn't it practicable to feed this ensilage through the summer season?

MR. SMITH.—It is entirely so, and that is what we are all striving for now.

A GENTLEMAN.—In my own State, a dairyman keeps about one hundred cows, and feeds ensilage all the time, and he claims that his cows are making something like a pound of butter per day, being fed on the fresh corn.

MR. SMITH.—There are frequently changes that you cannot account for. If a person goes into business he is watching for them. We always notice an increase in the milk when we commence to feed ensilage in the fall; not so much in the butter, but quite a little in the milk. I have experimented in feeding three cows until the last of August, and the cows' product was weighed every day with that of three other cows that ran in good pasture, and the receipts are equally as good from one as the other.

QUESTION.—Wouldn't it be cheaper to feed the ensilage, then?

MR. SMITH.—It costs only about two-thirds as much to feed ensilage as pasture. The labor of cutting the soiling feed and hauling it into the barn is very light indeed. No one who has ever practiced soiling speaks of it at all, or calls it extra work as those do who never have done anything about it. A young man eighteen or twenty years' old working for fifteen dollars a month will take a team and go into the field and cut sufficient for the night's feed and the next morning's feed. He can do this after ten o'clock, and get it done by noon, and have enough to feed one hundred cows. The actual cost of that man's labor is sixty cents a day. He milks, and that is enough to earn his wages, and if it took him half a day, it would only cost the cash outlay of fifteen cents to feed one hundred cows. Do you suppose that if it were a losing business those who have been trying it eight or ten years would be pig-headed enough to stick to it? By that process they constantly increase the tillable land, and in a few years, in our State, when land is advanced to $80 or $90 an acre, it will be a disgrace to pasture tillable land.

MR. MONRAD.—I would like to ask Mr. Smith to modify his statement that any young, bright, intelligent man can learn butter-making in a week. Of course, I understand Mr. Smith, and I have no doubt that right under his own eyes a good product would always be turned out, but I think it is a great trouble in this country that so many young men come to our creameries and work a short time and think they have mastered the whole business instead of undergoing a proper term of instruction or apprenticeship as we have in Europe. I think it might do harm if that remark went out unmodified.

MR. SMITH.—I will modify it, and reduce it to five days, and to show what a bright boy can do, I will tell you that Prof. Henry was one of them. Now, do not understand that I say I can teach a boy in five days to be a perfect hand at it, and go out and have entire charge of making butter, but for all practical purposes with me, I can teach him in five days to make butter as good as milk

will make. It is a simple process. You have a tank that will hold about eight cans of milk. There is a thermometer in front of the tank. You put in pounded ice and reduce it to forty-five degrees. The milk is drawn from under the cream the next morning; that cream is put away in the refrigerator in the summer, or in a room above the temperature of the living room in winter, and the next morning the process is the same. The two creamings are put together and one gallon of ripe cream ready to go into the churn is mixed in with these two creamings. They are set near a stove, where the temperature is about sixty-two degrees, warmed up to seventy degrees, and remain there four hours, churning the next morning. It will be just in the right condition. It will take but little practice with these instructions, as I have given them. I never spent in teaching a new man more than a few minutes, morning and night. About two weeks previous to the celebrated fair in Milwaukee, I hired a new butter-maker. I was busy collecting samples for the fair, but he made the butter in the greatest perfection, and I drew over two hundred dollars in premiums on that butter.

Mr. Monrad.—I am willing to accept Mr. Smith's modification, if he will supply a Hiram Smith with every new young man. I have seen some of the best butter-makers who have learned to make fine butter across the water, and my advice to them all is to go and learn to make butter with a good American creamery-man.

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# HOW TO MAKE BRICK CHEESE.

By T. J. FLEMING, Watertown, Wis.

**Cheesing the Milk.**—Brick cheese can be made by cheesing milk once a day, but the best possible results are obtained only when cheesed twice a day, or from freshly drawn milk which has not yielded up any of its cream. Bring the milk to a temperature of 90 or 94 degrees Fahrenheit by the application of heat or steam, as your contrivance permits. On a small scale, an ordinary brass kettle of the required size, placed upon the stove, but better hung by a flexible crane over the fire, the manipulations of which will enable you to accurately acquire the different temperatures required during the different stages of manufacturing, will prove sufficient for the heating and cheesing process. For operation in a factory, of course nothing short of a vat and boiler would be practical. These would cost about $125.00 (3,000 gal. vat).

**Adding the Rennet.**—The milk having been raised or lowered, as the case may be, to the temperature of 90 to 94 degrees, the rennet should be added. I recommend "rennet extract," as it has given me very good satisfaction. Take at the rate of a gill and a half of extract diluted in a gallon of water for 1,000 pounds of milk. Add it at the temperature of the milk, ascertained not by the finger but by a standard thermometer.

**Cutting the Curd.**—Stir constantly, but not vigorously, for ten minutes, and with this treatment normal milk will be

sufficiently coagulated to cut in twenty minutes after adding the rennet. Insert the forefinger into the coagulated mass, raise it upward and forward, and when the curd separates clean-cut and clears the finger, it is fit for cutting, which should be done with a horizontal curd-knife. But, if you are using the small kettle previously referred to, a flat, smooth and sharp stick will serve the purpose. Pass the knife lengthwise and crosswise through the vat—slightly inclined forward—and when through permit the mass to remain undisturbed for a couple of minutes, or until the whey begins to show on the top. Then take the curd scoop, sink it to the bottom of vat or kettle, and raise it to the top of curd, at the same time drawing gently backward. So continue over the whole mass. Immediately recut as before, moving the knife more quickly.

**Stirring the Curd.**—It is now ready for an increase of temperature, which should begin moderately, slowly and continually increasing until it has reached 110°, which rise should consume twenty-five minutes. During this process, the curd should be constantly and thoroughly stirred with the curd-stirrer or breaker, being careful not to let it adhere or gather on the bottom, when, at the expiration of this time, or the attainment of this temperature, the heating appliance should be fully removed and the thermometer brought into frequent use. Though the heat is now through with, the constant stirring should be continued at least twenty-five minutes, or until the curd will grit under the teeth, or appear elastic between the fingers. When this condition of the curd has been attained, draw off the whey by means of the syphon, or any other contrivance suitable to your surroundings, leaving enough to just cover the curd in the bottom of the vat.

**Salting.**—Rub the curd and the remaining whey vigorously between the hands, until it is thoroughly disintegrated. Add a couple of double handfuls of recognized dairy salt (salt as free from lime as possible) to 1,000 pounds of milk, and mix and rub it thoroughly, that it may penetrate the whole mass.

**The Press.**—It is now ready for the press, which, by the way, is of the simplest construction. Take three-quarter inch pine, eight inches wide, and dress it on all surfaces; cut and nail in a rectangular shape, 10 inches long and 5 inches wide, inside measurement, with height equal to width of board when dressed. This form or mold, when constructed, will consist of two sides and two ends, being without bottom or top covering, the sides of which must each have at least six small perforations through which the whey will ooze when the necessary pressure is applied, which consists of a following cover of the same material, working loosely within the frame, and two ordinary building bricks set together and edgewise upon it. These forms are set side by side upon a clean, smooth-surfaced table, and the whole mass (as we left it when salted in the vat or kettle) is dipped into them with the curd pail, at the rate of 1,000 pounds of milk to 20 or 25 forms, governed somewhat by the richness of the milk.

These cheese when cured will weigh about 5 pounds each, more or less, it taking about 9 pounds of normal milk for one pound of cheese.

**Pressing.**—Immediately after putting the curd, as evenly as possible, into the forms, they should be covered and pressed at once. Let it remain not longer than five or ten minutes, then they should be removed as follows: Remove the brick from the first form near-

est that end of the table toward which you are going to turn, then raise the form from you and give it a light and quick jar against the table on that edge nearest the cover. This will cause the cover, which fits loosely, to drop out; then place the form upon the table in an inverted form. Place the cover upon it, as before, and place the two bricks (now weighting the next unturned form) upon it, and so continue until the whole is gone through with. This process should continue hourly for the first three turnings, and once every four or five hours thereafter until the cheese has been in press 20 or 24 hours. In the summer months the cheese should be removed to the cellar as soon as made, the temperature of which should not exceed 65 degrees, if possible. The salt tables used generally are 35 inches wide in the clear, having a rim 8 inches high all around, to prevent the cheese from spreading and losing their proper and original shape.

Curing.— When the cheese are put into the salt table from the form, they should have salt well rubbed into them on all the surfaces, except the one upon which they rest, in a quantity not to exceed that which they will absorb in 24 hours. They should have four applications in this way, after which they should be removed to the curing room— a clean, dry, cool and well ventilated cellar. After you have gotten the cheese of four days' make into the table (using a separate table for night and morning), remove as many from the salt table to the curing room as you have fresh cheese to put in, always keeping the cross row in table full. The cheese having gone into the curing cellar, the actual and none the less laborious part of the work begins. One of the first objective points desirable is to carefully close all the pores on surface of cheese, which is usually done by rubbing them with a wet cloth in the process of washing. This should be done as quickly as possible to prevent the mold from penetrating the cheese, which is certain to be generated in the cellar, and attack the cheese where it is most easy of access. Cheese made as I have described will be about three weeks in curing, during which time they should be washed at least twice a week, and about as frequently thereafter while kept in stock, unless the cellar is very cool and exceptionally free from mold. The water used in washing should always be in the nature of brine, not so much on account of the salting effect given the cheese, as to prevent the gathering of mold. Though I have described the salting process, it is usually not sufficient, but is supplied during the process of curing by sprinkling a small quantity on the top surface of the cheese after being washed.

Boxing.—Many have inquired about the wrapping used for brick cheese. It will be seen by following the formula which I have given that there is none used. Simply, when ready for shipping, wrap them singly in cheese paper, and they are ready for boxing. Pack them on edge, end against end, two rows in the box. Place paper in the bottom of box before putting in the cheese, and another on top to prevent the flies, wind and heat from reaching the cheese.

# DAIRY FARMING.

By PROF. JAS. W. ROBERTSON, Guelph, Ontario.

**The Farmer's Sphere** — Of occupation is to provide food and the raw material for clothing for the rest of mankind. Himself and family have the right to a first toll upon all the fruits of their labors. In filling their place and doing their work, they must call to their aid and make subservient to their ends suitable domestic animals. In the past, as farmers have provided a better class of food, advancement has been made in all the attainments of civilization. Progress in agriculture has been leading men to better lives through all the ages. While people live solely upon roots and fruits, they are on the confines of barbarism. Civilized peoples subsist upon more varied aad substantial diet. Bread without butter does not satisfy. Meat of some sort must accompany potatoes; and so through the whole bill of fare vegetable foods are supplemented by animal products. To provide these latter of the most acceptable and nutritious kinds in the most economic way is the purpose and place of dairy farming. As farmers produce an increased quantity of superior food per acre, they make it possible to support a larger population. Population is the only element which gives value to property; hence, successful dairy farming means an increase of value in all property in a country or section where it is followed.

**Man's Servant, the Sun.** — Many parts of plants cultivated by farmers in a rotation of crops are entirely unsuitable for direct consumption by man. By making animals consume such plants or parts of them as are indigestible by the human species, there may be obtained from the animals, appetizing and nourishing products suitable for his table. That is the true place of dairy animals in farm economy. In order that animals may be kept with advantage and consequent profit, the farmer's skill and judgment should provide plants suitable for their maintenance. The sun is the working power that elaborates soil-food, commonly called manure, into serviceable form in the shape of plants. The sun is the source of all the energy which does all the work in the world. It is the veritable working power on all the farms, though too often its value and use are unknown and neglected. Plants are contrivances of nature, whereby and wherein the sun stores up his own strength and warmth for man's service and comfort. He should be kept at work all day long. When enough suitable material for the sustenance and increase of plants by their growth is present in the soil, the sun never fails to exert his energy for the service of man. When the soil is devoid of, or deficient in, the supply of these substances, simply from the want of the raw material upon which alone it can work, the sun is kept "loafing" over the fields day after day. No farmer can afford to have the hired man "loaf" around the kitchen stove while he himself toils outside. Much less can he afford to keep the sun idling over his fields. The

farmer's duty is to see that the soil of his fields contains all that is needed for the upbuilding of plants, and then, by proper management of the soil and selection of the seed, he may in fact harness the sun every morning and make it do his will. His occupation demands a brain, a judgment, a will to rule, in order that he may justify his birthright in being given dominion over the earth and its plant and animal life.

**The Air**—Is the source of a large per cent. of the substances that go to form the structure of plants. From it the sun is able to appropriate to the plant the very elements wherein he can best accumulate and store his strength for man's use. The corn plant is one of the best aids and means whereby this can be done. That it may be done most efficiently, corn should be planted thin where sunlight can shine and air circulate freely.

**Dairy Farming Enriches Land.**—Water is nature's universal vehicle for the carrying of the particles that compose the food of plants and animals to the proper places in their bodies for the sustenance of life and the increase of weight and size by the vital process of growth. The presence of too much water will hinder it from performing its peculiarly necessary tasks. Neglect of drainage will frequently leave such an excess of water around the plant roots, that they are literally drowned. The absence of sufficient water in the soil may cause the plant to starve in the midst of plenty. [The soil, besides its function for the retention of food for plants, also is the mechanical means for the holding of plants in position during their growth. Drainage and cultivation are treatments of it for the rendering of that food more easily available by plants ] In carrying on his work, and in the disposal of his product, three elements of cost to himself should be reckoned and remembered by every farmer. In the sale of every article of farm product he disposes of a part of the substance and fertility of the soil. To that he gives an increased value by the application of his labor and skill. In fact, in every article he parts with, he sells a three-fold commodity, namely, substances from the farm, labor and skill. Dairy farming will enable him to market much skill without the need for impoverishing his farm by selling its enriching substances—the elements of fertility. It also offers opportunity for selling skilled labor, which brings a larger return to the salesman with less permanent exhaustion of his powers. The following table will represent the gist of this idea.

| $200 *worth of* | *Substances of Plant food.* | *Labor and Skill.* |
|---|---|---|
| Wheat at $1 per bu..... | $48.00 | $152.00 |
| Milk at 85 cts. per 100 lbs... | 22.00 | 178.00 |
| Cheese at 10 cts. per lb.... | 18.00 | 182.00 |
| Beef at 5½ cts. per lb ..... | 17.00 | 183.00 |
| Pork at 5½ cts. per lb..... | 13.00 | 187.00 |
| Horse..... | 7.00 | 193.00 |
| Butter at 25 cts. per lb..... | 25 | 199.75 |

**Results of Skillful Farming.**—When only ten bushels per acre of wheat are grown, the farmer receives but $152 for all the labor and expense involved in the cultivation of twenty acres of land with the harvesting and marketing of its crop. Such labor does not bring him quite thirty cents per day. If by application of skill to his work he enriches his soil, drains and cultivates his lands and selects the kind of seed best adapted to his circumstances of locality and climate, he may obtain thirty bushels of wheat per acre. In that case he will receive an equal amount, namely, $152 for labor and skill involved in the cropping of but seven acres of land. When a dairyman keeps cows that bring him $15 worth of product a year, when he sells lean steers at 30 dollars per head, when he markets hogs that weigh 200

pounds at one year old, when he sells a horse for $75, and when he takes or sends to market strong butter that is dear at fifteen cents per pound, he gets hardly thirty cents a day as remuneration for his labor. If he will put skill into the selection, breeding and feeding of his cows, steers, hogs and horses, and into the handling of their products, he may make one-fourth of the labor bring him much higher money returns. For example, there will be left for labor and skill in the feeding of three cows $178 as compared with an equal sum representing the labor for the keep of thirteen cows. So on through the list, skill alone is the element that gives the value greater than thirty cents per day. The more skill that is exercised the higher and more certain will be the satisfactory remuneration.

**Cows Should Pay for Their Board.** —Reference has already been made to the plant which enables the farmer to use the sun's willing power for his own benefit. To a Wisconsin audience I will not venture to speak with any attempt at instruction upon the best methods of corn culture. Canada has been learning from you in this department. But in order that the plants grown may yield the best return of which they are capable to the husbandman, his skill should be exercised to provide animals which can return to him the most in products or service for the food which they consume. It is possible to keep animals which yield so much less in food than they eat, that they are veritable burdens upon the man whose property they are. Instead of being his servants, living and laboring for him, he sometimes becomes theirs and apparently lives to keep and feed cows, hogs, and horses. The cow in all civilized countries is always a boarder upon some person. She should be made to pay for her board at such remunerative rates as will leave a profit for the boarding-house keeper. If she fails in that, she should be made to render a service which she will not willingly contribute. Her carcass should be made into beef and her hide into leather. She should not be slyly sent to board upon some other unfortunate man. A cow with the business habit of keeping her accounts with the world paid up through the man who owns and feeds her is a good business cow. That is the kind of cow I recommend. Her power of service will be indicated by certain external points. She should have a large long udder of elastic fine quality; a mellow movable skin, covered with soft silky hair; a long large barrel, hooped with flat ribs, broad and wide apart; a broad loin, spreading out into broad long hind-quarters; an open twist with rather thin hips, and a lean neck of symmetrical length, carrying a clean-cut fine face with prominent eyes. A cow with these points has ability to serve a man well, if she gets a fair chance. That her calves may have powers equal to or rather better them her own, care should be exercised in their breeding. The best blood, of the breed adapted to the farmer's purpose, should be used to enlarge and not to lessen the working capacity to be transmitted to her calves.

**Feed.**—The milk of cows being a direct elaboration from their blood, whatever interferes with a healthy condition of that fluid will also affect the quality and quantity of the milk secreted. Too much care cannot be exercised in providing feed suitable, succulent, easily digestible, wholesome and nutritious. The grass of early summer is too watery and weak in nutriment for its bulk, to be fed alone to the greatest advantage. A judicious allowance of

bran, peas and oats, oil-cake or cotton-seed meal will increase the milk supply and fortify the cow's system for the larger production of milk during mid-summer, fall and winter. Fodder-corn, sown broadcast, does not meet the needs of milking cows. Such a fodder is mainly a device of a thoughtless farmer to fool his cows into believing that they have been fed when they have only been filled up. The same plant when grown under conditions favorable to its attainment of mature size and quality—in rows or hills 3 feet apart with from 2 to 6 seeds per foot in the row—yields a fodder by means of which cows are enabled to produce the largest amount of milk, butter or cheese per acre of the land required for their support. Fodder corn is not a complete ration for the most economical production of the best milk. When supplemented by feed rich in albuminoids, such as those already mentioned, better returns for the feed consumed are realized. Last summer one of our leading Canadian dairymen, feeding 18 cows upon fodder corn to supplement scant pasture, furnished milk to a cheese factory. In course of time he provided a supply of bran, and by the end of the first week thereafter he found by an examination of the factory books that he was credited with enough extra milk to pay for the bran consumed (2½ lbs. per cow per day), and to leave a balance of $2.43 of extra profit for that week.

**Water.**—Water is nature's vehicle for carrying about most of the matter which she requires to move from place place. The great boulders were quietly clasped in her arms and without apparent effort brought from the northern ridges to the southern parts of your State. The tiniest specks of nourishing matter needed to replace the worn-out tissues of the body are likewise carried to their proper places in this wonderful omnibus. The identical water swallowed by a cow to serve as a carrying medium in her blood for the equable distribution of the elements of nutrition throughout her whole body is made to serve a like function in the milk which she yields. If that water be impure in the first place, it is liable to continue so throughout its whole mission, from the drinking by the cow until after its consumption by the creature consuming the cow's product. Water which has been contaminated by decaying animal matter is especially likely to retain its impurities. The milk from cows drinking such water is a menace and danger to the public health, and interferes greatly with the commercial value of all dairy products. There should be an abundant supply of pure water, easily accessible by the cows during hot weather. It should be furnished at a comfortable temperature during the cold weather of winter. I have not found that cows which are denied access to abundance of water will give as much milk or milk of as good a quality as when plenty of water is provided with wholesome satisfying feed.

**Salt.**—Dairy cattle should have access to salt every day, and salt should be added to all their stable feed daily. A series of experiments has convinced me that when cows are denied salt for a period of even one week they will yield from 14½ to 17½ per cent. less milk, and that of an inferior quality. Such milk will on the average turn sour in 24 hours less time than milk drawn from the same or similar cows receiving salt, all other conditions of treatment being equal.

**Shelter.**—Comfortable quarters are indispensable to the health and well-being of cows. Stables during the winter should have a temperature constantly within the range of from 40° to 55° Fahr.

In summer-time a shade should be provided in the pasture fields, or adjacent thereto, to protect against the bristle-making influence of July and August suns. In all the management of cows such conditions should be provided and such care given as will insure excellent health and apparent contentment.

Milking.—When practicable, milking should be done by the same person, and with regularity as to time. He only that hath clean hands should be allowed to milk a cow. I say "he" because I think the men of the farm should do all the milking, at least during the winter months. I have exercised the right of changing my mind on that subject since I left the farm. It is no more difficult to milk with dry hands than with them wet. It is certainly more cleanly, and leaves the milk in a much more desirable condition for table use or manufacture. Pure stable atmosphere is indispensable to prevent contamination from that source. Immediate straining will remove impurities which otherwise might be dissolved to the permanent injury of the whole product.

Aeration.—After the straining is attended to, the milk should be aerated. Too often it is poured into one large can and left there just as the cows have given it. That neglect implies three things that are very injurious to its quality for cheese-making: (1) The peculiar odor which the cow imparts to the milk will be left in it until it becomes fixed in its flavor. (2) The germs of fermentation that come in the milk and from the air have the best conditions for growth and action when the milk is left undisturbed. (3) Then the milk will become almost unfit for thorough coagulation by rennet. Hence it is needful and advantageous to aerate it for three reasons: First, because by pouring, stirring, dipping or by trickling it over an exposed surface there is eliminated from the milk by evaporation any objectionable volatile element that may be in it. Secondly, because, as has already been stated, the milk contains germs of fermentation. Some of these are called vibriones. A strange peculiarity about these microbes is that they become active only in the absence of free oxygen. When warm new milk is left undisturbed carbonic gas is generated, and that furnishes the best condition for the commencement of action by these almost invisible creatures. After they get started they can keep up their decomposing work even in the presence of oxygen. It is impossible to coagulate such milk so as to yield a fine quality of keeping cheese. Coagulation by rennet of milk that is ripe can never be perfect unless it has been thoroughly aerated immediately after taken from the cow. *Neglect of aeration will increase the quantity of milk required to make a pound of fine cheese.* Thirdly, because the airing seems to give vigor to the germs of fermentation that bring about an acid condition of the milk, without producing the acid. So much is this so that *it has been found impracticable to make strictly first-class Cheddar cheese from milk that has not been aerated.*

Cooling.—The subsequent cooling of milk retards the process by which it is turned sour. Certain germs of fermentation exist in milk which in the act of multiplication split one molecule of sugar-of-milk into four molecules of lactic acid. By delaying the operation of these germs the milk is kept sweet for a long period. The cooling of milk should never precede the aeration. A temperature of from 65° to 70° Fahr. will be found cold enough for the keeping of milk over night, when it has been previously aired.

Protection.—Milk is a liquid of ab-

sorbent proclivities. It should be protected against injury that would result from exposure to impure air. A general-purpose milk-stand is a device specially adapted for the spoiling of milk in that way. Such a stand serves as a milk-stand and also a carriage stand, both of which are legitimate uses. Sometimes it is also occupied as a hog bivouac for the convenience of these animals, the end of whose whey trough furnishes one step for the stand. Both of these latter extensions of its uses and hospitalities are all wrong.

**Honest Milk.**—The employment of inspectors promises to improve the quality of the milk furnished by some patrons, whose highest moral aspiration is limited by an effort to keep the self-appointed commandment, "thou shalt not be found out." The adulteration of milk by the addition of water, the removal of any portion of the cream or keeping back of any part of the strippings is forbidden by statutes. Any person who is found out so doing should not escape lightly.

**Matters Most Needful of Care.**—In the following short paragraphs I have ventured to gather helpful advice on the matters most needful of care:

1. Milk from cows in excellent health and apparent contentment only should be used.

2. Until after the eighth milking, the milk should not be offered to a cheese factory.

3. An abundant supply of suitable, succulent, easily digestible, wholesome nutritious food should be provided.

4. Pure cold water should be allowed in quantities limited only by the cow's capacity and desire to drink.

5. A box or trough containing salt to which the cows have access every day is a requisite indespensable in the profitable keeping of cows.

6. Stagnant impure water should be prohibited. The responsibility for the efficacy of that beneficial prohibition rests wholly with the individual farmer.

7. Wild leeks and other weeds common in bush pastures give an offensive odor and flavor to the milk of animals consuming them.

8. All vessels used in the handling of milk should be thoroughly cleansed immediately after their use. Washing first in tepid or cold water, to which has been added a little soda, and subsequent scalding with boiling water, will prepare them for *airing*, that they may remain perfectly sweet.

9. Cows should be milked *with dry hands*, and only after the udders have been washed or thoroughly brushed.

10. Tin pails only should be used.

11. All milk should be properly strained *immediatety* after it is drawn.

12. Milking should be done and milk should be kept only in a place where the surrounding air is pure. Otherwise the presence of the tainting odors will not be neglected by the milk.

13. All milk should be *thoroughly aired* immediately after it has been strained. The treatment is equally beneficial to the evening's and the morning's milk.

14. In warm weather all milk should be cooled to the temperature of the atmosphere after it has been aired, but not before.

15. Milk is the better for being kept over night in small quantities, rather than in a large quantity in one vessel.

16. Milk-stands should be constructed to shade the cans or vessels containing milk from the sun, as well as to shelter them from rains.

17. Only pure, clean, honest milk should be offered. Any deviation from that will not always go unpunished.

# THE ELABORATION OF MILK AND BUTTER-MAKING.

By PROF. JAS. W. ROBERTSON, Guelph, Ontario.

All milk, like some butter, is fearfully and wonderfully made. With reference to the elaboration of milk I mean all that the sentence expresses; and, as a people earnestly progressive in the search after further information concerning dairy husbandry, I find the people of Wisconsin earnestly anxious to learn. While I admire the progressive earnestness of your people, I have no words of commendation for that quality of butter which can be shortly defined as "progressive." It goes on from strength to strength continuously.

**Milk Elaboration.**—Milk is secreted by and in two longitudinal glands, commonly called the udder. These two are separated by a fibrous partition, which is attached to connective tissue under the skin. That tissue also spreads through the udder, apparently for its support in position. The udder is spoken of as having four quarters. That is popularly correct, although the division between the two quarters on each side is not definite or distinct. The gland stripped of its covering, is a reddish grey substance. In dry cows the deposit of fat in the connective tissue gives it a yellowish appearance.

The internal canal of each teat opens into a milk cistern. The total quantity of milk held in the four cisterns or reservoirs at the top of the teats will seldom exceed one quart. Numerous ducts arise from these and branch into all parts of the udder. The ducts and their branches become smaller as they spread, until each one ends in a vesicle, or "ultimate follicle," about one-thirtieth of an inch in diameter. Into these cavities, the serum of the milk—its water, casein, sugar, albumen, etc.—seems to pass from the arterial blood through capillary tissue. A change in the cell albumen of the blood is believed to take place during that transition. The inside of each vesicle is studded with innumerable cells. Through these the fat is produced, supposedly by budding. There are ordinarily over 1,000,000,000 of these globules in a cubic inch of milk. They have no organic pellicles or so-called skins. The activity of secretion depends largely upon the vigor of the blood circulation. The production of fat depends mainly upon the temperament of the cow, gentle handling, and feed rich in protein. Violent disturbance of her nervous system has a disastrous effect upon the cell action and capillary activity in most cases. Arteries, veins and nerves together pervade the whole of the udder structure. New ducts are formed by sprouting or spreading out from the others. Rubbing of the udder, rapid and clean milking will promote their growth and development until the sixth year of the cow's age. A pressure of fat in the connective tissue on the gland interferes with and hinders the secretion of milk.

**Separation.**—It is practicable to separate cream from milk, only because the fat globules which should mainly compose the cream, are lighter than the serum of the milk in which they float. The means for separation may be spoken of as natural and mechanical. In both cases the globules are made to travel in a direction opposite to that of the force which is exerted upon the serum or heavier portion of the milk, which is a solution. The fat globules are in the form of an emulsion in that solution. The setting requirements are a falling temperature of from 90 to 40 degrees Fahr. When milk has become colder than 90 degrees before it is set, the rate of separation is proportionately slow in all milk, except that wherein the fat globules are extra large. To raise the temperature to the required point, water as high as 125 degrees may be added to the milk. Such an addition of water will also reduce the viscosity of the serum, and thus permit the fat globules to have an easier passage through it to the top. Prof. Babcock has done the dairy world admirable service by his researches into the contitution and physical nature of milk. Wisconsin has acquired world-wide fame, more through the work and triumphs of some of her citizens in dairy matters than by all other achievements of her people, which erstwhile had alone been acounted worthy of public mention. When the milk is set, all disturbance tends to retard the separation of the cream.

**Cream.**—Cream is merely that part of the milk into which a large proportion of its fat globules should have been collected. They have not been collected into the average cream of hotel tables. Occasionally in butter-making difficulty is experienced in effecting separation between the globules of fat and the serum of the cream, which is the whole endeavor and aim of the operation of churning. To make that easier, about 25 per cent. of pure water may be stirred into the cream while it is still sweet. Thereafter the cream should be ripened by souring before the churning is commenced. Taking a quantity of cream containing 100 pounds of butter fat, it is possible by proper souring to recover 97 pounds; while, if an equal quantity of cream of equal quality were churned sweet, not more than 77 pounds of the fat would be recovered in the butter. While the cream is ripening under ordinary conditions, frequent stirring will prevent the formation of any thickened part on the top which is apt to result in leaving white specks in the butter. If uniformity can be secured without stirring, it may be omitted, but not otherwise.

**Churning.**—The range of churning temperature for ordinary practice is from 57 to 64 degrees. For some time after the milking season of a cow begins, the fat globules are of a softer quality than they become some months after parturition; hence, during that period and in the early summer, the churning can best be performed at from 57 to 60 degrees. Later in the season, and in the other case as to length of time after the calving of the cows, it may vary between 60 and 64. No one can afford to try to make butter without the possession and proper use of a reliable thermometer. The churning, by which the globules of fat are impacted into each other, should not be continued after the particles of butter are half as large as wheat grains. It is usually preferable to stop when they are smaller. A small quantity of water should be added; and the churn revolved a few times before any attempt is made to withdraw the buttermilk. Then, after the removal of the buttermilk, water

should be added at a temperature of about 55 degrees. The washing will thus be effected in the granular state; and all subsequent rubbing and working for the expression of the buttermilk may be avoided. The working of the butter should be effected by pressing and not by rubbing. The temperature should be from 55 to 60 degrees. The movement of the butter is after all less likely to make it greasy or to destroy its grain than its working at an unsuitable temperature. Salt should be added to suit the demands of the market to be supplied. For immediate consumption, half an ounce per pound of butter, will give a mild flavor very acceptable to most eaters. One ounce of salt per pound will preserve the butter for a longer period; but not much more than half an ounce of salt is retained in the butter in a dissolved state. The reworking of butter is of some service in removing any speckiness and also in increasing the waxy quality of the butter's texture. In preparation for the market, the rolls, prints or packages, should all have a neat, attractive appearance. The less crimping, or attempt at such ornamentation, the better will be the taste of the butter and the taste of the maker.

Conclusion.—In conclusion, the winter season is certainly the time of the year for butter-making in the northern part of the American continent. Our adaptation is for cheese-making during the summer and for butter-making through the winter. By such means stock-raising is encouraged instead of hindered; and the highest market price is realized when the production is greatest. By making butter upon the co-operative plan, six times less capital will be required for machinery equipment, and six times less labor for the manufacture and marketing of the product. In butter-making, he who makes good butter does a good thing, for fine butter is practically the materialization of sunbeams for the comfort and sustenance of man.

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# FEEDING HOGS TO PRODUCE BEST RESULTS

By THEO. LOUIS, Dunn County, Wis.

On the subject of food supply for swine there exists much difference of opinion. I can only give my own views from a practical standpoint, as a farmer.

Feeding for Fat.—The prime object in feeding swine is often to accumulate fat as rapidly as possible on those intended for market. Too often this proves a failure, when in the bill of fare clover and pasture are omitted. To keep stock hogs in healthy growing condition, and to have brood sows in the best condition for bearing and suckling their young, the stomach must be kept healthy and not overloaded; the food must be in variety and in suitable quantities. The hog cannot thrive on an exclusive corn diet and mature, and green clover as an exclusive diet is as far wrong as dry corn. To feed sour slop, for instance, with clover would be another error. Clover contains acid enough in itself. If we could have roots, at that time of the year, such as beets, rutabagas, or man-

golds, which contain large quantities of soda salts, it would prevent an undue acid condition of the stomach; therefore, we have found that a feed of corn with clover gives a better balanced ration. Let all grain rations in whatever form they are fed while swine are on clover be sweet, for the best results.

**Soiling With Clover.**— The advisability of soiling hogs with clover has been advocated. I admit, that when in the fattening process a daily ration of cut clover is given, especially when corn meal is used, there is advantage gained in receiving greater returns from food consumed. Great profits may be derived from soiling, and one may be able to feed at least 14 head of hogs to the acre, as I know from actual test in soiling several score each season; but with comparatively cheap lands, and high prices for labor, the question as to profit remains doubtful as yet. Another consideration: There would be a lack of exercise for the development of the young and growing animals, and if permitted to run in a large and roomy yard, the losses of manure would largely offset the profits. I do not as yet find any other method superior to the division of fields with moveable fences, so as to have new, fresh fields alternately during the season. I have found, also, that a mixture of grasses is preferred by the swine. They love a change and variety. The feeding value of clover has been estimated all the way from 600 to 1,000 pounds of pork per acre; my experience leads me to conclude that the former is nearest correct.

**Pigs Good Grassers.**— It is often disputed that pigs, when nursing the dam, and liberally fed night and morning, eat much clover. I have found that they are not only good grassers, but that they make larger growth and are more vigorous than when reared on grain alone. The storing system is largely practiced in our State, to keep pigs and shotes during winter. Prof. E. W. Stuart says that if pigs were like a wagon, a bin of grain, or a mow of hay, they might be kept without expense over winter; but when we reflect that two-thirds of a full ration is used merely as food of support without adding any weight or value to the pig, the practice is indefensible.

**Clover Hay for Hogs.**—Clover hay, especially that from the second cut, if stacked in a sunny and sheltered place, and care is taken that around the bottom of the stack the ground is kept clear of snow and the coarser refuse, will be found a great aid to the man who adheres closely to the proverb, "root hog or die;" but for the intelligent, thinking farmer, there is a still wider field of profit. By cutting, and moistening the hay with either steam or hot water, all will be eaten with considerable relish, giving growth and health to the pigs, and fitting them for successful, rapid fattening animals, either for spring or summer market. I have found it better not to cook or steam clover hay, as it becomes tasteless, and pigs largely refuse it, and also that shorts mixed with clover are not so readily eaten as cornmeal, the former containing nearer the same food relation to clover. The pig is a good chemist, if you give him a chance. If clover hay is either cooked or steamed, unless the entire quantity is cut fine or short and mixed with sufficient grain to absorb the water, it will be better to use only the so-called hay tea, which is of a strong and pleasant odor. I have found it an excellent substitute for water to prepare swill for farrowing sows.

**Clover Ensilage.**— Last, but not least, comes the clover silo. It has been conclusively proved, during the last

season, that the silo has been a greater success in preserving clover in a sweeter condition than corn. It now only needs perseverence and intelligent application, to show to what extent we can use clover ensilage as food for hogs. Undoubtedly our dairymen will give it their attention another year, for surely their discussions on corn ensilage this winter lead me to think that it is not often a balanced and succulent ration. I fear, from a breeder's standpoint, that the result from an all corn ration may become disastrous to them in time.

**Feed Judiciously.**—I am in favor of the clover field and a clover ration, but safe and judicious feeding must go hand-in-hand with them, and I feel that I am far from the true problem of cheap and profitable food rations. The ever increasing fertility of our soils produces more, cheapens our rations to meet the ever increasing competition of cheaper meat products, and adulterated lard.

**Value of Experiments.**—It is fortunate for our State, and the agricultural interest, that our experiment station has come so bravely to our aid. Prof. Henry, assisted by an able corps of assistants, has advanced some ideas that are often contrary to the experience of most of us, but he has figures to substantiate his assertions. Every intelligent citizen recognizes the supreme importance of our agricultural interest, and that its development imperatively demands that accurate experiment be made for the settling of mere opinions, and for the development of new truths.

In conclusion let me say, with F. D. Coburn: Pasture—let this word be written in capitals by every man who raises swine; it is the secret of success. Permit me to add clover.

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# THE SCIENCE OF PIG FEEDING.

**By GEO. McKERROW, Sussex, Wis.**

**Cost of Producing Pork.**—Sir J. B. Lawes, of Rothamsted, Eng., found by experiment that cattle utilized 8 per cent. of the dry substance of their food, the sheep 12 per cent., and the hog 20 per cent.; but as the hog's food is of a more concentrated, valuable kind than that of cattle or sheep, we do not claim that his meat is produced at less than half the cost of beef, or at nearly half the cost of mutton. But we do claim that the hog, when properly handled, is among the most economical machines for changing coarse grains, grasses, and roots, into a valuable meat product. Now, the question arises, how can we profitably feed this animal so as to meet the stringency of the times and the demands of the markets.

**To Secure Early Maturity.**—Fellow farmers, this is an age of early maturity. It has been clearly demonstrated that it is the young animal that gives the best results in increased weight for the food consumed. To secure this early maturity requires careful thought and good judgment, which every feeder should exercise to the best of his ability. He should study carefully the food, care and comfort, of the animal, so that a high, muscular condition may be developed, which will in-

sure health and vigorous digestion, both of which are necessary to profit.

**Ration for Young Pigs.** — Whole milk, nature's most perfect food for the growth and healthy development of young animals, should be our food standard for them while young, and the more approximate to new milk we can make our ration for the young pigs the better will be the results. This ration must be so formed as to be rich in muscle-forming or nitrogenous elements, and, as Prof. Henry demonstrated, in his much quoted experiment of 1885, that the bone and muscle of the hogs fed on a muscle-forming or protein ration were on an average nearly 50 per cent. stronger and larger than those fed on fat and heat producing foods, rich in carbohydrates, and that those very important organs, the liver and kidneys, were much larger in the protein fed hogs, we must conclude that for the sake of health and vigor we need such muscle-forming rations.

**Folly to Stick to Corn Alone.**—To stick to corn, and corn alone, in the face of these facts, is the height of folly. Our experience has taught us that an entire corn ration soon damages the organs of digestion; and the main secret of good feeding is to get the animal, when intended for the market, to eat and assimilate all the food possible. This can only be done by feeding a proper amount of a balanced ration, for if we feed too much carbohydrates we not only lose a part of the food but overload the organs with useless work, and the same is true of too much albuminoids.

**A Good Ration for Young Pigs.** — As a food for young pigs, we have found a mixed ration of 50 per cent. middlings, 25 per cent. corn meal, 15 per cent. bran and 10 per cent. oil-meal, wet up to a creamy consistency, and fed three times daily in such quantities as they will eat up clean, and at the same time appear to be satisfied, gives us the best results. In addition to this, a few whole oats on a clean plank floor and a few roots in their season make valuable adjuncts. As they grow older, we increase the corn meal until, at 5 to 9 months old, 50 per cent. corn, 25 per cent. middlings, 15 per cent. bran and 10 per cent. oil-meal form their rations.

**Pasture for Hogs.**—Believing that the hog's stomach needs a fibrous food, as a divisor we aim to give them pasture in summer, and some hay and roots in winter. You may question the profit in using some of these foods, and ask, why do you feed bran, clover and clover hay? I answer because, first, they act as a divisor for the more concentrated foods, and allow the gastric juices a better chance of permeating the whole mass, and, second, they are all nitrogenous foods; and, again, you may ask, why buy costly oil-meal?—to which I will answer, first, it has a highly stimulating effect on the digestive organs and the whole system, without any reaction; second, it is one of the best nitrogenous foods that we can use. When hogs are well grown, from seven to ten months of age, they will stand heavy corn feed for one or two months, and lay on weight quite rapidly, but even then they will do better with a good supply of clover or roots.

**Ashes—Charcoal—Salt—Sulphur.** —We have found wood ashes, charcoal, salt and sulphur, as well as coal slack, to be relished by our hogs, and therefore believe them to be good, when carefully fed, as appetizers and assistants of digestion.

**Skim-Milk.** — Skim-milk, which is too rich in albuminoids, should be balanced with corn-meal. Prof. Stewart recommends 1 lb. corn-meal to 2 lbs. of milk, while Prof. Henry 1 lb. corn-meal

to from 1 to 1½ lbs. of milk. In one of Prof. Henry's experiments, of 1887, where he fed 1 lb. of corn-meal to 1.1 lbs. of milk to 37 pigs, I have figured out that his pork cost him $2.82 per cwt., allowing milk to be worth 25 cts. and corn-meal 75 cts. per cwt.

**Sweet Whey.**—Sweet whey, which is rich in carbohydrates, or heat and fat-formers, should be balanced with a mixture of 50 per cent. middlings, 40 per cent. bran and 10 per cent. oil-meal. Mixing this with whey at the rate of 1 lb. of meal to 5 lbs. of whey, will give fairly good results, but if your whey is sour you had better mix the meal with water. We once fed a lot of shotes on a mixed ration, buying all the feed consumed, when the price of feed was higher than at present, and produced pork at 3¼ cts. per lb.

**Comfort.**—The comfort of the animal has much to do with his development, and to be comfortable he must have clean, dry, moderately warm, well ventilated quarters to rest and sleep in. To have this comfort, it is not necessary to have an expensive hog-house. In fact, most of these expensive hog-houses are acknowledged by their owners to be a sad disappointment.

A number of small, moveable houses suit our ideas best, for several reasons, among which are, first, cost; second, they can be moved to the pasture in the summer, and when the soil of one yard becomes foul from use they can easily be moved to another; third, in case of contagious diseases there are not so many under one roof.

There are many plans for these small houses, all of which have their advantages and disadvantages. The one we use is made eight feet square on the bottom, with roof slanting from the outside of floor on each side to peak, rear and front boarded up, with door in the center of front. This pen costs less than $5 when completed, can be moved anywhere on a stone-boat and will accommodate anything, from a brood sow and litter to 6 or 8 shotes. We use common 16 feet boards, cut in two, for both floor and roof, and four two by four scantlings, eight feet long, for sills. A window above the door to let the sun's rays in to warm up pigs and bedding is also essential.

We also have a small moveable yard, 6 by 6 feet, 3½ feet high, boarded up on three sides, with floor, that can be placed in front of these houses when we wish to confine the occupants.

**Exercise.**—Exercise is necessary to promote the health of the growing animal; therefore we prefer to give the pigs the liberty of a yard or pasture, and induce them to work by scattering a few oats or shelled corn on some hard spot of ground or plank floor.

**Breeding Stock.**—In the rearing of breeding stock, I would not force them quite as much as those intended for the market, but would endeavor to keep them rapidly growing, not allowing them to become stunted, for once allowed to contract the unthrifty habit, no matter how well fed and cared for afterward, they never will get back to their original habits of assimilating food, and thereby turning it to the best advantage.

**Health.**—The health of the animal requires all these precautions in feeding. Why is it that the swine plague has never appeared in Canada, where no corn, comparatively speaking, is fed, but such foods as oats, peas, bran and middlings make up the ration? My friends, if properly fed and cared for, the American hog can produce Irish bacon good enough for the epicures of Europe, and he will be muscular and healthy enough to again enter the ports of Germany, although he may have to carry Bismark out of the way on his broad muscular back.

# CARE OF BROOD SOWS AND YOUNG PIGS.

By GEO. WYLIE, Leeds, Wis.

**Points of the Brood Sow.**— The first consideration should be that the animal is worthy of the best kind of care. In selecting my brood sow I want a good, frank, open, intelligent countenance. Did you ever see a hog with that kind of a face? If not, the sooner you begin to look for it the better; that is if you are in the hog business. I want constitution, substance, vitality, good, hard, flinty bone, and plenty of it. Proper discrimination must be made between this quality of bone and bone that is coarse or soft and spongy. The general outline of the animal must suggest ranginess and plenty of room. I want limbs of medium length, strong foot and pastern, length, breadth and depth of body; a well sprung rib, a full deep flank. She must be naturally a good feeder, with strong powers of assimilation. I don't care how large she is, provided she is symmetrical in form, and does not show coarseness. I will not object to this kind of an animal, though her ear may be a trifle "off" from the standard. She may even have a well defined "swirl" in her back, or be lacking a little in the regulation markings. In passing, let me say that this class of swine can't be produced on a diet of corn. Such animals are the result of long-continued selection from animals that have been properly bred, fed and cared for for many generations.

**Selecting the Brood Sow.**— The prospective brood sow should be selected generally before attaining the age of four months. She should be allowed to run with the rest of the herd as long as the feed is made up of bone and muscle-forming constituents. When the finishing process begins on the rest of the herd, and the feed is carbonaceous in its character, your brood sow should be kept apart from those intended for market.

**Feeding.** — To crowd pigs intended for breeders on fattening foods as you do those intended for pork is simply ruinous. When the assimilating powers of the growing pig are taxed to the utmost on fat-forming food, the breeding qualities, the vitality and future usefulness of the animal are sure to be impaired. A growing pig will seldom get too fat for breeding purposes if properly fed on bone and muscle-forming food, even if fed all it can eat, provided it can run around and take plenty of exercise. It is after it has attained its growth that injury may be done by overfeeding or by keeping it in too narrow limits while growing. Skim-milk, shorts, oats, grass and exercise, with a very limited amount of corn, are among the principal requisities for the successful growth of a young brood sow.

**Age for Breeding.**—No brood sow is at her best as a brood sow until she is two years old, or over. When fully matured, they give more milk, have a greater capacity for assimilating food and, as a consequence, their pigs are stronger, healthier and grow faster.

**Good Milkers.**—We must insist on

breeding only from sows that have proved themselves good milkers, or that are descended from good milking strains. These milking strains in swine are just as pronounced as milking strains in Jerseys and Holsteins.

**One Litter a Year.**—In summer, after the pigs have ceased running with their dam, let her have a run on grass with very little grain. Don't fatten her up, but let the system get rested preparatory to raising another litter. One litter per year is all she should raise, if you want to keep up the vitality of the stock.

**In Winter Quarters.**—We prefer to have mature sows go into winter quarters in rather thin flesh, but still in good heart; and then, during gestation, keep them gradually gaining up to farrowing time, which, in this latitude, should not be much before the middle of April. During the winter they should not be crowded for room; not even four or five mature sows should be allowed to sleep in one apartment. Those of like size and disposition should be kept together. Some sows as they grow old acquire an over-bearing disposition, and make life hardly endurable to the rest of the herd. If such animals are too valuable to dispose of, they should be kept by themselves.

**Feed During Gestation.**—During gestation the feed should be of a bone and muscle-forming character. I have found oats, shorts and corn, in equal parts, with roots enough to keep the system cool, free access to charcoal, wood ashes, and salt, with an occassional lump of hard lime morter, and plenty of exercise, to give as good satisfaction as any combination I have ever tried.

**The Farrowing Pen**—For a mature sow should be not less than 8×10 feet in size. It should have a tight floor, with a fender placed around the sides. Pens should have plenty of sunlight, good ventilation, and clean dry surroundings generally. Very little bedding should be given, and that preferably of cut straw or chaff. Damp bedding, or dampness of any kind, is very injurious to young pigs, and should be guarded against. Brood sows thrive better and are really more valuable if you make pets of them. When you find one disposed to cultivate your acquaintance, always notice her—the chances are that she is a good one.

**Treatment at Farrowing Time.**—In regard to the treatment at farrowing time, opinions differ. We formerly placed our brood sows in pens by themselves a week or two previous to farrowing; but for a number of years past we do not give them a pen apart from the rest of the herd until from 6 to 24 hours before farrowing. In separating a sow for a week or two, there is a tendency to restlessness. She is anxious for the companionship of her mates, is usually deprived of her accustomed exercise by being confined in smaller quarters, and the general result is feverishness of the system, which is just the condition of things, above all others, that should be avoided. If she is quietly separated when she instinctively desires to be alone, all danger from feverishness will be prevented.

**After Farrowing**—Give her nothing until she appears hungry, and then only a light feed of thin, warm slop, made by stirring a handful or two of shorts or bran into less than half a pailful of water. Do not enourage her to eat. A few roots and free access to charcoal will have a cooling effect on the system, the condition of which should be carefully watched for the first few days. Be in no hurry to crowd her with feed, as for the first week or two the pigs require very little for their nourishment. Exer-

cise and sunshine at this age is of the first importance. When they are four or five days old, they should be out-of-doors with their dams every pleasant day. They should not be let out in the morning until the dew is off the grass, and should be returned to the pens early at night. A little fresh earth is conducive to health in the young pig. In this respect he differs materially from a certain other animal that nothing short of "the *whole* earth" will satisfy.

# FEEDING SWINE FOR MARKET.

By THOS. CONVEY, Ridgeway, Wis.

**Give the Pig a Good Start.**—Few feeders recognize the necessity of giving the young pig a good start. If through want of judgment, or want of care in changing it from the milk of the sow to other food, liquid or solid, it suffers from impaired digestion or defective nutrition, it may get a set-back from which it will never fully recover.

**Food of Support and Production**—The principal part of our hog crop is marketed when they are about eighteen months old. The average weight at that age could be easily attained by a pig nine months old, the amount of food consumed by the former being nearly twice as much as that eaten by the latter, the younger pig receiving more during the early, and the older requiring more during the latter part of its existence. A certain amount of food is required to keep an animal in its present condition. This is termed the food of support. All food given in excess of the food of support is termed the food of production, and in feeding should go to increase the weight. The food of support constitutes about seven-tenths of a full ration, but the food of support for a restless, irritable hog may very nearly approach the food of production for a well-bred, well-fed hog, the cravings of the appetite of the former causing him to take a needless amount of exercise, and all muscular exercise is at the expense of food. The poor hog also becomes the prey of internal parasites, when placed upon full feed, as he must be, to prepare him for market. He over-eats, there is over-distention of the stomach, causing comparative inaction of that organ, and he can only digest and assimilate a portion of the food he consumes.

**Points in Favor of Early Maturity.**—The younger hog is converted into a more edible product, commands a better price, is generally ready for a better market, gives quicker returns and requires less attendance. He can be fed when on pasture, the droppings are not wasted, and food is not expended in keeping up animal heat during the entire winter.

About the only argument that can be made in favor of keeping the older hog is because our daddies did it. Profitable hog-feeding for market is not possible after the first year. You not only have to provide for additional growth, but also for organic waste in the growth already secured, as mutability is one of

the inexorable laws of nature. This waste is presumable greater in a large animal than in a small one.

**Feeding to Produce Gain.** — Repeated experiments have demonstrated, beyond a doubt, that the most profitable feeding is during the early period of an animal's existence. This is especially true of the hog. The modern hog, with liberal feeding, will reach maturity in about two years.

Prof. Sanborn, of Missouri, in more than one hundred feeding tests, determined that to make a certain amount of gain, pigs weighing 220 lbs. required 18 per cent. more food; pigs weighing 270 lbs. required 50 per cent. more food, and pigs weighing 325 lbs. required 78 per cent. more food than pigs weighing 70 pounds.

Prof. Hunt, of Illinois, determined, by actual experiment, "that the gain for the amount of food consumed decreased during fattening." Also, "that an insufficient food supply for two weeks caused a very considerable loss in feeding thereafter."

**Feed Young Animals.**—Chemistry informs us that the younger animal utilizes more of the elements contained in the food than the older animal does.

Prof. Henry says of feeding cattle: "You cannot be too careful about putting your feed and money into young cattle, and avoiding old ones." This is more applicable to hogs than cattle, as the hog reaches maturity in about one-half the time cattle do.

**The Right Kind of Food.**—Another essential of successful hog-feeding is to give the right kind of food. All the substances that enter into the make-up of an animal are derived from its food. No single article of food is capable of supporting a healthy hog, except for a limited period. Grass, especially clover, is one of the best of hog foods, but is too bulky for the stomach of a hog to produce the best results. It should always be supplemented with grain. One bushel of corn fed to a hog when it has access to a good clover pasture, will produce more growth than three bushels when corn is fed exclusively. All foods consist of certain elements. All farm animals consist of about the same combination of food elements. The right combination of nutrients to promote the most successful growth of an animal is not found in a single article of food. The different articles of food are generally divided into two classes: First. Protein foods, also termed flesh-formers. Second. Carbohydrates, also termed fat-formers. Clover, oats, peas, beans, bran, shorts, skim-milk and butter-milk belong to the first class, as they are rich in bone and muscle-forming elements. Corn, barley, whey, roots and acorns belong to the second class, as they are rich in heat and fat-producing elements.

**What and How to Feed.**— Corn should never be fed as an exclusive ration except at the close of the fattening period, and then only for a limited time. Whey should always be fed sweet, as the small amount of solids it contains consists mainly of sugar of milk. In souring, the milk sugar is converted into an acid, and has little or no value as a food. Whey should always be supplemented by a nitrogenous food. Butter-milk has twice the value of whey as a food. It should be fed as fresh as possible, and can be very profitably fed with corn. Skim-milk should always be fed sweet. Sour feed of any kind is of questionable value; a slight degree of acidity may not be injurious in some kinds of food, but this does not apply to feeding skim-milk and whey.

**Give a Protein Ration.**—Pigs usually receive a ration too rich in carbohydrates and deficient in protein. The necessity of giving a nitrogenous or protein food cannot be overestimated, especially to young pigs, as they require twice as much nitrogen as old hogs; yet feeding for health or profit is not subserved by feeding protein foods alone, as they are constipating, and, except clover, costly. An experiment has demonstrated that one bushel of corn will make as much pork as three bushels of oats; yet good oats are an excellent hog-food, being rich in nitrogen, and the ash that is necessary for the formation of bone.

**Give a Balanced Ration.**—The advantages of giving a properly balanced ration, suited to the age of the pig are: You secure greater growth with a given amount of food. You also obtain a better quality of meat. There is a more perfect growth of bone, and greater muscular development, both being promoted by a moderate amount of exercise. A high degree of muscularity indicates a condition of the system the least liable to disease, also the most perfect condition for breeding animals. Prof Henry says that pigs should not be confined to close quarters for more than sixty days. This is certainly long enough.

**Cooking Food.**—While I am satisfied that the tests carried on by our experiment station prove that giving hogs cooked food exclusively does not pay, yet I believe, for fall feeding, where hogs are taken off the pasture, it is very advantageous to feed once a day on cooked food. For this purpose, roots, cooked about the same as for table use, should be mixed with ground oats, rye or other nitrogenous food. Sugar beets are very valuable for fall feeding, but turnips, raw or cooked, are better for winter feeding, as they are better keepers.

**Peas and Oats.**—Peas and oats sown together are a very valuable crop. They can be sown at the rate of one bushel of peas, and one and one-half bushels of oats per acre. This crop can be cut with the binder, and threshed as readily as oats alone. Care should be taken not to sow on ground where oats lodge. They should be sown early. I raised last year forty bushels per acre, weighing 44 lbs. per bushel. When ground, they are a good substitute for bran and shorts, but may be fed whole to hogs. The object of improved agriculture is to obtain the largest amount of nutritious and life-sustaining substances from the smallest possible space. This, to a considerable extent, is secured by retaining and increasing the fertility of the soil, and by skilful feeding; but the customary way of hog feeding is as great a robber of fertility as the much condemned wheat raising. Grain and milk are largely fed to hogs in pens without regard to saving manure, for it is leached out and washed away, and only a small portion of the least valuable part returned to the soil. Added to this is the loss occasioned by washing away of the surface soil in corn-fields, where the land is rolling, this being augmented by not observing a suitable rotation with grass.

**Skillful vs. Poor Farming.**—The person who causes two blades of grass to grow where only one grew before is regarded as a public benefactor. Too many of us not only fail to produce the two blades of grass, but, on the contrary, expend two blades, or its equivalent, to secure results that the skillful feeder, with a well-bred animal, can obtain with one. Is it any wonder that the good farmer can make money every season, while the poor one is complaining of weather, crops and prices?

## Valuable Experience with Hogs.

[*Discussion of Preceding Papers.*]

PROF. HENRY. — Two years ago we took pigs of the same litter and fed one lot in one way, and the other in another way, exact rations, and have followed out the experiments later in such a manner that we know we can do the same thing again and produce the same results. Chas. W. Garfield, of Michigan, said: "That is very nice work, but I don't believe you can do it again." We have done it again and again. Last summer we killed pigs at the farm where one lot had been fed upon these carbohydrate feeds, and another lot on protein feeds. We found that there was a difference in the solid matter of the blood—there was twenty-five per cent. more dry matter in the blood of one lot of pigs than in that of the other; we found that the bones were stronger, that there was an actual difference in the strength of the bone. We have gone over the work in another direction since last summer. I am now trying the effect of feed upon bones, to see if by feeding ashes we can get strength into the bones, feeding wood ashes with corn.

I heard a farmer say the other day, at a meeting: "If my pigs get too fine bones I send off and get a large boned sire, and in that way I keep up the strength of my pigs." Suppose the Arabian horse-breeder should send out of Arabia to get a large-boned horse to keep up his herd of horses! When you have to send off your farm to get other stock, except for the purpose of changing, your system of farming is wrong in some way. If the bones of your pigs become smaller, there is something wrong. Your soil is against you, your feed is against you. If a country cannot make people grow up to their normal stature, and be strong and vigorous, there is something wrong with the soil and the climate. I say when the American farmers are feeding any line of stock so that that stock is degenerating in size or in constitution, they should stop and say: "What is wrong?"

Another point. I meet a farmer and he says: "I get twenty-five cents a pound the year around for my butter. I don't sell my butter at the corner grocery; I have customers, a picked trade. They are people who eat good things in this world, and pay me for my butter." That is very well; but, my friend, where do you sell your hogs? "Oh, I sell my hogs to the hog buyer, drive them in a wagon and they go in the cars with Tom, Dick and Harry's hogs, and they go to Chicago and are sold." Now, the cases are not entirely parallel, but in a degree they are, and people living as near to good commercial cities as you do here, ought to think of this thing. Here is Milwaukee with a couple of hundred thousand people, and Chicago with some eight hundred thousand. There are people in Milwaukee and Chicago who pay high prices for all the pork they eat. The bacon that supplies many of the wealthy people of Chicago comes from Ireland. They are not Irishmen; they don't care to help Ireland out, but they say: "The bacon is better flavored," and they don't care if it costs several times as much as it would here. There has a large trade sprung up at one of the stores in that city for that kind of bacon. Some people will buy high priced things because they are high priced. We have "got onto" this idea in butter, and make it for that kind of a market, but we have never thought about it in pork.

There was a college boy years ago who went out and took his father's farm in Massachusetts, and the first year he care-

fully cured the meat from eight hogs. He sold or gave away that meat to his friends in Boston. The next year they came back, and said: "We want some more of that sausage," and that year he put up thirty hogs. Now he puts up over three hundred hogs a year, and last January, when I was at the Reade Hotel in Chattanooga, Tennessee, I had the pleasure of ordering from the bill of fare sausage from that farm in Massachusetts. Now, why should Massachusetts hogs have to go down to Tennessee to be eaten? Why should we allow the trade to come in that direction? At one of the institutes we stopped at a hotel at Mazomanie, and a farmer came in with his sausage to sell. Three or four workers gathered around him, and the hotel man told us how the farmer made the sausage, and brought it in to sell, and we bought some and took it home in our grip-sacks. The landlord says that man was once poor and in debt for his farm. He began to peddle sausage, has now a large trade, his sausage is known all over the country, and people are glad to pay a little extra for it. This is just a hint which I think is worth following up. We might just as well shut out this Irish bacon, and have these people pay us two prices for this product as not to get it.

My friends, I hope you will think of these matters. Every time one of us steps out of the ordinary, we leave a little more room for the crowd that is left behind. We will get a little more and the crowd will be better off.

MR. SHERWOOD.—Do you suppose that I could get one-tenth of a cent more for a hog raised on the more approved plan than I could for a hog raised in the ordinary way?

PROF. HENRY.—Probably not at first; but if you had taken your butter to the corner grocery without striking out in any other direction you would still be getting corner grocery prices. The hog buyer won't give you any more, but there is somebody in Chicago who will. Somebody will pay you a special price for lean-meat sausage, another for fat sausage that he knows is carefully made. Of course, it will cost something to find the customer, but that is true in the butter trade or any other kind of business.

MR. LOUIS.—On that point I want to say that last winter Mr. John Plankinton, after he had shown me through his slaughter-house and packing-house, said to me: "Mr. Louis, if the farmers of the State of Wisconsin, or any set of farmers, will give me the assurance that they will find us a few car-loads of hogs that are fed to lean and fat, we will give a large money premium, and will advance the price of the pork on such a product. That shows that there would be a market for specially bred and fed hogs. It is very easy to raise that kind of pork for the market, and it is just as cheap to raise it for the market as it is the fat pork.

It merely exists in the brain of a man that he makes cheaper pork out of corn alone. I am feeding a lot this winter a right balanced ration, which will give me a lean and fat hog. In fact, I have put forty-eight hogs on the market in Eau Claire to one of our packing houses, which were deemed the finest hogs that ever entered upon the block in Eau Claire. They were just fed on clover and corn. At the same time in the fattening process their swill consisted merely of shorts alone, and I find that these hogs are very far superior; they contain a greater proportion of lean meat. That was at least the judgment of the packer.

QUESTION.—Did you get any more for them?

MR. LOUIS.—Yes, I was paid nearly three-quarters of a cent more a pound than the general market was giving then.

MR. HIRAM SMITH.—It seems to be the opinion of many here that it costs something extra to make this pork and sell it. They are laboring under a great mistake. The last four or five years I have made this pork because I could make it the cheapest, and after a few local butchers found out that this pork gave better satisfaction to the retail trade, and made more sausage from the same cost of food, they told me to sell no more pork to Chicago buyers; that they would always give me a little more than I could get to ship it upon the markets of the world. They wanted it for their local trade.

MR. GORDON.—I know the Deerfoot farm pretty well. I know Mr. Burnett pretty well; I have been there a good many times and studied out that question. It is largely a matter of curing with the Deerfoot people. Mr. Burnett buys the average pork of his own neighborhood and cures it. I remember some years ago going to England and sitting down to breakfast the first morning and admiring the bacon. I said: "If I could only get such bacon as this for breakfast in America, I would eat it every morning." I was a little surprised when they told me it came from Milwaukee, and showed me the brand. The trouble with the average bacon as found in the village grocery store, is that it is improperly cured.

Now, isn't there right in this vicinity a market for such a product? Isn't there a big reputation for the Oconomowoc sausage in the Chicago market? The Oconomowoc people make a market for that kind of pork. Last summer they asked me if I had not some nice lean fed hogs, and told me, if I had, to ship them down and they would pay considerable more for them than the ordinary corn-fed hogs.

There are butter and cheese factories at almost every corner in this wide State. The making of butter has been systematized until Wisconsin creamery butter will outsell any creamery butter in the world. Why not have some co-operation or system in connection with the bacon-curing process? Why should not the farmers who live near together get together and put in a curing establishment and start a business? I believe it would not be long, if the product was what it ought to be, before a good trade would be established in Chicago. There ought to be a chance in this State for an industry in curing pork, and it is, after all, as much the curing as the feeding.

PROF. HENRY.—My main point in this work is not that we shall have all lean meat, or all fat meat. It runs in the direction of breeding. I don't believe you can feed lean meat into a mature hog any more than you can feed constitution into a man. Muscularity is something that comes from constitution. You cannot feed muscle into a prize fighter. When he goes into training he does not increase in muscle; he trains water and fat out of his body. What I want is that our breeding stock should have the proper proportion of bone, muscle and fat, and you can't make muscle and bone with corn only. If you want to fatten, you can feed corn exclusively for a few weeks, but do not understand me that you want to go into producing that kind of hogs. I want you to have fair judgment in raising your breeding stock, and not be satisfied when your hogs die and prove unsatisfactory, but look into it and find out what is the matter. There must be something wrong in the

way we feed if we have that kind of result.

MR. LOUIS.—I want to say this about the Milwaukee bacon: When I was at Mr. Plankinton's slaughter-house I saw one thousand selected hogs—selected for the purpose of going to the English market. Their cellar is about one hundred by one hundred and eighty feet, and the pork was piled up about four feet and a half high, all in process of curing. I asked the manager of the packing house if this pork was the same as the hogs that were killed to-day by selection. He replied: "The majority of it is, because we can only get that kind of bacon, or that kind of cured pork, out by selection, because our hogs, as a general thing, are corn-fed hogs;" so you see even the packing-houses have an eye to selection.

MR. HOXIE.—I have two neighbors. One of them put his shotes into a clover pasture in the spring and kept them there and fed and fattened them in that same field. He had enough to make two car-loads. They sold in the Chicago market for fifty cents a hundred more than any hogs that came in that day, because they were strong of muscle and bone. The others were fed on corn and did not have the strength and muscle to bear the shipment. That was sometime ago. Since then, Prof. Henry has shown us the reasons why these results would follow, and I, for one, as a Wisconsin man, feel proud that the State of Wisconsin has the the experiment station that we have, and that we have a level-headed man to work it.

MR. MCKERROW.—The Oconomowoc sausage factory has been mentioned here. Mr. McDowell runs this establishment, and a friend of his was at my place last fall, and looked over a lot of nice healthy hogs, and he said: "If you want to sell those hogs, Mr. McDowell will give you a cent a pound more than the market price, and he told me if I saw any such hogs as this to tell the owners to drop McDowell a card. He wants nice, young, thrifty hogs, not very fat. There is a gentleman named Nye, who lives between Appleton and Green Bay, who told me, two years ago he had built up a good trade on this pork. He started with a couple of six-months-old pigs that he tested. He sold them to a gentleman in town at the market price; the next fall he wanted more, and then he began to sell in Green Bay, and he says he cannot furnish enough hogs for the business. He gets two cents a pound more for them than his friends get, and he thinks in time he will raise it three or four cents. In this audience I see a Waukesha County farmer who has been treating hogs in this line for some time, and I believe that he gets more for the hogs that he sells in Milwaukee than the going price. I wish you would tell us, Mr. Hodson, don't you get more for these pigs of yours?

MR. HODSON.—Yes.

MR. HARDY.—The question with the farmers is, is there any more profit in selling these hogs? Is there any more money in it to the farmer if he sells a hog weighing 200 pounds and gets ¾ of a cent more a pound for it than if it weighed 250 pounds?

PROF. HENRY. — With the average breed of hogs that we handle here, there is very little profit after the hog weighs 300 pounds. The most pork is made with the least feed immediately after the pig is weaned. A pound of feed will produce more pork then than at any time in the pig's life. As that pig grows older he costs more every day. You can see that when he is a 100-pound hog he has to keep up that 100 pounds every day; he has to vitalize it, and then he has to add his weight to that. Up

to the 275-pound or 300-pound point, in some cases the hog does not grow much more expensive, but after you touch 300 pounds it goes up very rapidly. For instance, when a hog weighs 100 pounds it will take, say, 3½ pounds of food to carry him for a certain time, but after 300 pounds it will take 7 pounds to carry him for the same length of time. If our pigs are worth so much, my judgment is we will not carry them over 200 pounds; but the way we raise them we have to carry them further, up to 300 pounds. If we can buy pigs for the same price, we had better sell them when they weigh 200 pounds, and put that money over into another animal. There is no place more unprofitable for a farmer to put his money than into a big hog or steer. We are weighing steers at the farm every day, and we are weighing their food and I can make more money with a little calf for a given weight of food—with a 200-pound calf—than I can with a 1200-pound steer. I have had my students figuring on that thing this winter, and they are pretty well satisfied.

MR. THOM.—I have in mind a steer 5 years of age, that weighed 2000 pounds, fed for 365 days the same feed that he received the years before, and he didn't gain a pound; weighed 4 pounds less.

MR. WYLIE.—There is no time in the life of a pig that you can make pork so cheaply as you can between the weights of 50 and 75 pounds. After leaving 75 pounds your feed is costing you a little more right along until you get up to 250 pounds. At 250 pounds their feed and every pound you put on is costing you 25 per cent. more than it did between the weights of 50 and 75 pounds.

I would consider about 15 pigs, of the age Mr. Van Dusen speaks of, as many as should be allowed to feed and sleep together. Pigs can be grown far more evenly and with less liability to disease if divided up in this way, each lot having free access to pasture with a dry place to sleep and a clean place to feed. With protein food and proper sanitary regulations, the danger from disease will be so reduced as to practically cut no figure in swine raising.

SUPT. MORRISON.—The great fact that a certain amount of food goes to support, and all that is consumed and appropriated above that to growth and profit, must be kept in mind by every one who expects to make a profit in growing or feeding stock. It is the idea that underlies all successful feeding operations. It follows, then, that the animal which can turn the most surplus food into marketable flesh is the most profitable animal to feed. Sir J. B. Lawes found by experiment that cattle utilized 8 per cent. of the dry matter of food consumed, sheep 12 per cent., and swine 20 per cent. As the difference is slight in the amount of food required to support life, in proportion to weight, in these three three domestic animals, it is clear that the hog is by far the most profitable machine for converting food into marketable meat, and the large percentage appropriated accounts for the rapid gain in flesh under heavy feeding. It should, however, be borne in mind, that the quality of the food consumed by the hog is more valuable than that consumed by either the steer or sheep. But, with all due allowance for the difference in food, there is still a handsome margin in the hog's favor, as the cheapest producer of meat on the farm.

MR. SAWYER.—Through the great corn belts of Illinois, Missouri, Kansas and Nebraska we have immense corn crops, and an immense quantity of hog cholera. That point comes in right here. It is a great question whether our hogs are likely to have hog cholera or any other

disease by our present way of feeding. If the pig's blood is 25 per cent. stronger by feeding, as Prof. Henry suggests, and the liver is heavier and the kidneys are heavier, the question is whether that will not make the animal less liable to disease. A good many of our hogs eat up our corn crop and then lie down and die, and we don't get anything. The stations have offered immense rewards for cures for hog cholera. I believe Prof. Henry's theory is working toward a solution of that problem. You cannot take an animal that has fed on corn for two years and cure it of hog cholera, but improving the breed is the best cure for the hog cholera that this country has ever seen.

MR. VAN DUZEN.—I have had some very severe experience with that disease in buying Western hogs, and I am satisfied that we cannot expect to fight it, even by feed. I will say that my experience has been that pigs are the ones that I have made money on, not wintered hogs, although I paid more than 10 cents a pound the next year to try to do the same thing. I bought about 150 pigs from 4 to 8 weeks old. They were well raised, all on one farm and about one age, and the animals were fed from the silo, together with bran and middlings. They grew very nicely, but these pigs, after they got to be about 3 or 4 months old, took the hog cholera from some wintered hogs that were kept in a separate field. I was so careful as to have separate men attend the separate lots of pigs. I put the pigs in separate pens, 25 or so in a pen. They never had a bit of grain or corn meal. They had been fed on middlings and other grain in connection with buttermilk, and were very thrifty and strong, but I lost from 30 to 40 per cent. of the lot, some from each and every lot that I had. I speak of this to show that while I do not doubt that, according to Prof. Henry's theory, we can make stronger pigs, and that they will be less subject to hog cholera than pigs fed upon corn alone; nevertheless, it is not safe to expect to fight the disease in this way. I can bear out the other statement that is made that it is more profitable to feed young pigs. Those pigs that I fed from the spring until September, I got 7½ to 9 cents a pound for, and when the ordinary time came for selling ordinary hogs, dressed pork was down to 6 cents.

MR. WYLIE.—It makes no difference how your hogs have been fed, if they are exposed to cholera, they are liable to catch it; but with this system of feeding that we are talking about, the cholera will not originate in your own herd.

MR. LOUIS.—We receive hog disease, as a rule, from infected districts; that is certainly true. Four years ago a gentleman bought two brood sows in Eau Claire, from a car-load of hogs that came from Kansas, and which were diseased. He bought only these two, and, being confined in a pen nine days, they became sick with hog cholera, or hog fever, or whatever we may call it, and the disease spread down the Chippewa Valley, and across the Chippewa river to the West line of Dunn County. Then a large lumber firm keeping 800 hogs sent for me and asked: "Mr. Louis, what will be our preventive against the disease?" I said: "Don't feed any meat from your slaughter-house; keep your establishment clean, that is, your hog-yards and the like; have a high, sanitary care and don't buy any live hogs or any pork." My caution was not heeded. They bought live hogs, and in November disease broke out in their yards. The disease was brought fourteen miles by importation. I was asked to

come over and see what I could do with the hogs. Of course they could do differently from any farmer; they could give me twenty men at a moment's notice. I had the hogs passed through, one by one. Every hog that showed disease was killed, and the others were transferred to new yards. Mr. Knapp gave these hogs, by actual weight in the drug store, ten drops of carbolic acid for a week in succession. They lost one hundred hogs, but the disease stopped.

MR. STICKNEY.—The question was asked here whether it didn't cost something to find customers for these better products. Of course, for the first customer, or the first ten customers, it does cost something, but after that those better products find their own customers. If they are used, they are appreciated, and every customer finds others, and in a very brief time it becomes much easier to market those better products than the common ones. In a load of fruit brought in the market to sell, the finer fruit sells, while the poorer is rejected or sold at a price that does not pay. Every farmer knows that a better product of any kind will sell when he can't sell the poorer at all.

MR. FLEMING.—Is it possible to feed a hog for eight months and make him weigh two hundred and fifty pounds or over, and at the some time have him fed for lean? If it is, this can be done and done in such a way that the extra price that is received from that pork makes it profitable. I believe you are a unit in believing that the profitable time for disposing of pork is at about eight months. I do not believe that is invariable; I think the surroundings a man has for raising and feeding those hogs cuts a material figure. He can do it if he is a dairyman. I believe with the aid of the silo he can winter hogs and sell them at about a year old weighing about three hundred pounds and at the same time feed for this much desired lean.

MR. CONVEY.—The gentleman has answered his own question. Where the by-products of the dairy are used, there is no difficulty in securing the lean meat and the growth too; that is with good breeds of hogs.

For my part, I do not think it requires any particular skill to cure pork properly. Every man has the means at hand of very cheaply curing meat and putting it on the market. In my neighborhood I have noticed what they call breakfast bacon, which sells for fourteen cents a pound. One gentleman near us sells several thousand pounds at that rate.

MR. R. FARGO.—Mr. Fleming, how do you feed your hogs?

MR. FLEMING.—I feed largely on skimmilk, being a dairyman, and considerably on grass in the summer time. I feed young hogs three times a day, and older hogs I would not care to feed more than twice a day; but my rule would be to feed them as often as they showed an ability to utilize the food. I feed my milk cold in the summer time, and without freezing in the winter time.

MR. BEACH.—I buy my hogs, keep them about sixty or ninety days and then sell them. I buy them at about 100 to 150 pounds and feed them and sell them at 200 pounds, any time when they will bring the highest market price. I feed milk and give them all the green feed they will eat. I cannot always feed the milk sweet in the summer time, though I think it is better sweet; but the hog will eat it sour if you give him meal enough. I think there is no profit in feeding a hog after he weighs 250 pounds.

QUESTION.—Does the fellow of whom you buy them make any money?

MR. BEACH.—Yes, he makes more than I do. He can make more on the first 150 pounds than on the next 150.

MR. HARDY.—It seems to me that the supply and demand has something to do with this. I have known the time when a 300-pound hog would bring very much more in the market than a 200-pound one.

MR. HODSON.—We find the best results by feeding young pigs three times a day. If we feed oftener they seem to be more restless. When they get to be three or four months old, we feed them twice a day and give them all they need. We send them to market when they weigh 175 to 200 pounds. Our winter pigs we sell in the spring. Our March pigs we sell in August or September.

MR. LOUIS.—I would like to know what is the use to kick against the pricks? In a late swine-breeders' convention in the State of Indiana, one of the members was appointed to make inquiry at the different packing houses what kind of a hog was wanted in the present market. The answer from six of the largest packing houses was: "We want a hog that weighs 250 pounds." Now, why should we kick against something that is to our profit?

MR. TOOLE.—I think it is plainly indicated that we in Wisconsin may open up not only in our near cities, but in the markets of the world, a better product and better prices for our product; but certainly with all this breakfast bacon and all this sausage, the lard will be on our hands. Still I want to call your attention to the encouraging fact that in all the towns of Wisconsin, the people, if they can buy farmer's lard will not buy Chicago lard.

MR. VANDUZEN. — Simmered right down to the real question, we must suit the product, whatever it is, to the market we have to supply, and if we believe there is the most money in supplying a certain kind of butter or a certain kind of hog, then we must find the market that wants that kind of butter or hog, and if the farmer hunts out the market that wants an article that he is preparing, and prepares that article in a way to get a reputation out of it, and it deserve a reputation, he is certainly going to make money out of it. I have some doubts about three times a day being often enough to feed young pigs. We know that they are in a habit of getting their dinner whenever they want it before they are weaned, and feed oftener than that. Just before I left home I sold twenty-five pigs, all just eight weeks' old; they each weighed close to twenty-five pounds. I fed them about as near right as I knew how, and sold them for five dollars apiece, to go into a creamery just for their feeding value.

PROF. HENRY.—I want to call the attention of the farmers to the wonderful changes that are going on in regard to the development of this country. A Massachusetts farmer said to me, coming on here: "There are farmers over a vast area of this country feeding hogs on corn worth from fifteen to twenty cents a bushel, on land worth twenty dollars an acre, farmers living in cheap houses, without many of the comforts of life that Eastern farmers have. You are competing with these on $40., $50 and $60 an acre land. Down here are two vast cities with men worth all sorts of fabulous sums, and eating all sorts of good things." This has come up within the memory of many. Now, shall we throw everything into the hands of a few Chicago monopolists in the way of this hog business? Shall every hog come into town and go into a car and into Phil. Armour's packing house? You make a fuss about binding twine monopolists, or something

of that sort, spend lots of time and talk and money at it and yet you stick to this same plan with your hogs. Wisconsin pork and Wisconsin cheese ought to go down to New York and sell on its merits and reputation, so that the New York folks will look for the Wisconsin brand every time. Let us boycott the way that the general hog business has been running, as much as we can, in a business-like manner. If your neighbors here in the city have money and will pay fifteen or twenty cents a pound for sausage when ordinary sausage is sold a little cheaper, let us make the money. I don't say this to you old farmers. Many of you have done your work, but don't stop the boys. Because the old man wants to haul the hogs to town on a wagon, don't think the boys must do so. You bought land at $1.25 an acre, and you have done well because you have held it, but remember your boy has to take the farm at $50 or $60 an acre. You see the times are changing, and if there is anything in it, let us get it out of it.

MR. WYLIE.—Altogether, figures and experiments go to show, beyond a doubt, that the largest returns for food consumed are made in the young and growing animal. There are other conditions connected with swine raising that farmers do not study close enough. One of them is the markets. A study of the pork market for twelve years past will show the highest price each year, without variation, during the months of July and August, and the lowest generally during November and December. April pigs can hardly be ready for the July or August market, but are usually sold when packers are getting all they can handle, and are "bearing" the market. Thus the profit of early maturity is frequently lost by the lowness of the price. Under certain conditions, farmers could have the pigs farrowed in June or July. At this season the brood sows and young pigs will almost take care of themselves, and a larger per cent. of pigs be saved than if farrowed earlier in the season. The pigs can be kept gradually growing through the fall and winter, and in spring given a run on clover or bluegrass for a month or two, and then, with a crib of old corn, they could be got ready for market when pork is highest.

The main objection to this system is wintering the pig, and as pigs are commonly wintered in this State, they do not pay for the food consumed; but with proper shelter and care, pigs farrowed in June, July, or August, can be wintered in Wisconsin, and wintered at a profit. The principal advantages of this method are selling when pork is highest, and the benefits derived from a month or two of pasture in the spring. Grass, it must be remembered, is the cheapest feed in the whole list, and pigs that have been wintered are in just the right condition to make the best kind of gain on it. They have the advantage of making the most of the grass at a season of the year when it is at the best, and after this run on grass their stomachs and general system are in just the right condition to make the largest possible returns in pork for the corn consumed.

Your April pig, although he eats a little grass during the summer (and what he eats tends to keep his system in condition and so far helps him), yet a pig under four months old will make no substantial gain on grass alone. By the time he is old enough to utilize grass profitably as food, the best pasture is gone. Of course, conditions and circumstances, the kind of farming you are engaged in, have something to do with whether you adopt this method or raise an April pig (March pigs are too weak), and sell him in the fall. The

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represent about three days' time. Suf-

wintering system is more applicable to farmers who raise car-load lots, than to dairymen or those who raise but a few.

MR. THOM.—I want to say one word in the same line. We ought to begin to do our own business instead of having somebody else do it. Even if it don't pay on the start, we have the comforting assurance that we are doing it ourselves. For instance, seven-tenths of the farmers of Wisconsin are carrying their butter down to the corner grocery and taking what the grocer has a mind to give for it, and he puts the price on his own goods and makes you take them in trade. You have milked the cows, done the work, and he fixes the price and you take it. I have not anything against the grocerymen, but before I would patronize that kind, I would see him hanged higher than Hamaan. I remember about the first money I ever had—$12.50—for working two long, hard months in harvest. The proprietor gave me a $10 bill and $2.50 in change. I walked home four miles and lost it on the way, but I hunted around and found it, and the next day I walked to a village store and threw that ten dollar bill very independently down on the counter and said: "Can you give me two fives for that?" Then I went across the street to another store and threw them on the counter and I said: "Can you give me a ten for them?" It was the satisfaction of doing my own business.

So I say, a man who don't eat his own dinner never can grow in size, and that man who does not do his own business never can grow in breadth and power, and it is time that you and I stood on our own rights and asserted them and had something to do with the business that is going on in this great commonwealth.

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# CAN WE GROW BEEF PROFITABLY ON HIGH-PRICED LAND?

**By H. C. THOM, Madison, Wis.**

**Slip-Shod Handlers of Scrubs.**—So long as the beef market needs a float, and Wisconsin owns men who hope to foster a profit dollar, slip-shod handlers of scrub stock may join hands and fortunes with Milwaukee's almond-eyed citizens and "take a walk." It is with fear and trembling that I pronounce that fatal word "scrub." It is like unfurling a red rag before Mexico's idol. Some wise individual is wont to spring to his feet and carry an assemblage from the winding paths of the sage-bush plains to the Arabian sands in a vain and inglorious search for a thoroughbred. This blooded solon who is indigenous to the stamping grounds of agricultural societies and State institutes, feels keenly that if he can command the attention of one man in an audience of 2,000, for ten minutes, he has the unbounded gratitude of the remaining 1,999, whose ten minutes each represent about three days' time. Suf-

fice it to say that we mean a class of cattle that does not grow poor from dragging about what they eat.

**A Lesson from Low Markets.**—In our opinion the low market referred to is of value to Wisconsin feeders who are not driven from the business. The man who jumps from one line to another when he sees a red flag flaunting over his market, deserves but little sympathy. It is well that the eternal fitness of things gives him a low price, in his new venture, just when he gets ready to turn off the largest product. When the low market does come, the intelligent feeder and business man does not waste his vitality in trying to raise prices by grumbling about the times, but immediately turns his attention to producing an article at less cost.

**Wasting Forage.** — The severe drouth of two years since drove the truth home, that Wisconsin farmers had been wasting nearly enough forage to carry the stock through the winter. Men of straitened circumstances fell down on their knees before a corn stalk. and lifted their hats respectfully when they passed a straw stack.

**Feeding Steers for the Block.**—One who contemplates feeding steers for the block need go to no great expense. We venture a maxim here. When no one wants an article, buy. When people are tumbling over each other to get it, sell. A thoroughbred sire, a registered animal of the beef type, is the only change that need be made. This will place you in possession, in a little time, of grades that will get more of a bushel of corn on the outside of the ribs than would stick under the pelts of a dozen scrubs. (A humble bow to the man who says, "what is a scrub?")

**Hints on Feeding Calves.**—A calf should be taken from the dam at two days of age. It is unwise to withhold the first milk of the mother from the calf. The calf should get whole milk for one week, and then skim-milk may be introduced by degrees, thus getting him on skim-milk entirely when two weeks old, and none the wiser for the change. Some may say that wiser is not applicable to a calf. Calves have been known to play with a feeder, and take every trick. As a rule, the trouble is we try to feed calves when they are not hungry. Then, too many have a blind idea that a calf can draw milk through a finger. It is an easier operation to probe the finger. Give the calf two fingers, and we have a machine, as good for the purpose as a nursing tube.

About the time the calf is on skim-milk entirely, whole oats placed before him will stick on his nose, and he unconsciously learns to eat. The ration of oats should be increased to keep pace with the assimilation. Another advantage in feeding oats is that, in eating them, saliva is absorbed, and he never gets that pernicious habit of pulling another calf's ear. A calf shows best treatment when fed three times a day. Two or three quarts of milk will answer.

Fresh water should be within easy reach. A calf will do better turned in a lot without a blade of grass than he will on the freshest of pasture. A shed from the sun and a lock of dry hay are essential to rapid development. Milk should not be fed sour or cold. The finger is a good thing with which to point out neighbors' faults, but does not serve well as a thermometer. One can get along with his wife much better by heating water than he can by burning milk to the bottom of a kettle. A kettle of boiling water will raise enough milk to blood heat to feed twenty-five calves. More calves are spoiled by over-feeding than by starving.

The oat ration should be continued

until the calves are a year old and turned to grass. Feed milk as long as you have it in the fall. Calves that are intended for the block should never be introduced to a stanchion.

Sheds — Dehorning — Stables. — A good shed, liberal bedding and liberty, make a good match for fat calves. Ensilage, oat straw and bran or oats make a growing ration for yearlings. Horns should be taken off before turning to grass, in spring, when one year old. Upon reaching eighteen months, steers should be fed in barn or shed with no floor. If the manger is raised two and one-half feet above the floor, it is not good economy to clean the stables from fall to spring. More straw can be converted into manure in this manner than by any other process. One need not fret about how much evaporates or how much leaches. All, both liquid and solid, is saved. Stables can be kept sweet by the use of land plaster. Steers that are coming two can be kept gaining on ensilage and straw.

Finishing for Market.—When warm weather comes, the cattle can be finished for the June market on corn and grass or corn and ensilage. Too much trouble? Do you know of any thing that is too much trouble for your acquaintances, if they can see money in it? If treated as suggested, these steers will weigh twelve hundred pounds, and are just what buyers want.

Cost.—What is the cost? A calf will drink twenty hundred of milk, which, at twenty cents, is four dollars. He will eat fourteen bushels of oats, which at thirty cents, is four dollars and twenty cents, and one dollar and eighty cents of dry forage, making a cost of ten dollars A ton of ensilage in the silo costs one dollar. The calf will eat two tons or two dollars worth. He will eat ten bushels of oats, or three dollars, making a total cost, at one year, of fifteen dollars. The rental of a good acre of pasture is five dollars, which will support two yearlings, or two dollars and fifty cents. A steer coming two years will eat six tons of ensilage, or six dollars, making total cost when he goes on grass, at two years, of seventeen dollars and fifty cents. A steer of two years, on grass, will eat ten cents worth of corn, per day, for ninety days, or nine dollars. An acre of good pasture will support two steers, fed on corn at the same time, for ninety days, which, at five dollars per acre rental, is one dollar and twenty-five cents, making a total cost of thirty-three dollars and seventy-five cents. One hundred and sixty acres of good plow land will carry twenty milch cows and turn off fifty steers a year.

Swine—Shorthorns.—Steers should be fed whole corn to finish them. While fed on corn the cattle should always be followed by shotes or breeding sows. By careful selection and good treatment, cows can be readily found among the Shorthorns that will give two hundred to two hundred and fifty pounds of butter; and although I have seen raving maniacs among Jersey, Guernsey and Holstein men, I have never found one who was so thoroughly demented as to advocate throwing that amount of butter away, even if it did come from the patient Shorthorn, that animal which has done more to educate and enrich the English speaking people than all other breeds combined.

# MANAGEMENT OF PREGNANT ANIMALS.

By V. T. ATKINSON, V. S., Milwaukee, Wis.

**The Fœtus.**—The fœtus is nourished from the mother, though the fœtal circulation is distinct and different from that of the mother, that is, the blood of the mother does not circulate directly into the vessels of the fœtus. The fœtal circulation is made up entirely distinct and when the blood is placed under a microscope, it discloses the fact that the corpsucles of the fœtal blood are a great deal smaller than those of the mother. After half the period of gestation is passed, the fœtus takes on life. The fœtal heart may be heard beating, and the pulsations are a great deal more rapid than those of the mother, showing that it is entirely separate from that of the mother.

**Periods of Gestation.**—Of the different periods of gestation, I have made a little table which has been carefully compiled by some of the best authors. In the mare 340 to 350 days is the average, or between the two extreme periods of 300 to 400 days, according to Fleming; in the cow, 283 to 288 days, or from 250 to 300 days; in sheep, 147 to 151 days; in pigs, 120 days, as an average, or from 110 to 130; in the dog, 63 days, or from 55 to 70. The male fœtus is generally carried a few days longer than the female.

**Care.**—The pregnant animal should be kept in a condition tending to promote health in the ordinary condition of the animal, that is, there should be no particular pampering on account of the particular condition. Animals should have exercise and good nutritious food. The conditions of the surroundings in each case may call for slight variations, but the general rule should be such as would preserve health under ordinary circumstances.

**Pasture—Stable—Medicine.**—Hilly pastures should be avoided as much as possible, and slanting stable floors or deep gutters in which the animal is obliged to stand with the hind feet. An unbalanced position of the body, particularly during the later period, by which the hind feet stand lower than the fore feet, will tend to bring on complications at the time of delivery. The doors of the stables, of course, should be so wide as to prevent any possibility of bruising. The animal should not be subjected to any undue excitement or worry by dogs. Surgical operations should be avoided, and when medicine is necessary, it should generally be administered under the care of a veterinarian.

**Symptoms of Pregnancy.**—Of the symptoms of pregnancy, the most characteristic is the enlargement of the abdomen. Another symptom that is mentioned by most of the authors is a particularly quieting effect that it sometimes has upon the animal, lately illustrated under my own observation in the case of a little mare that was brought to the farm, and used for some time, being perfectly quiet and easily managed until after she dropped her foal, when she became a perfect vixen, and I

understand that that is her usual temper.

Another symptom that is described sometimes, is an enlargement of the udder, sometimes so far that a small amount of milk is found. That enlargement disappears and will re-appear again about the end of the period of gestation, when the milk will be secreted to nourish the fœtus.

About the middle of the period the fœtus takes on life or has power of motion. That motion is most noticeable in the morning, and may be made more violent by giving the female cold water to drink before she has any food; the cold water acting as somewhat of a shock on the fœtus. This is not a good practice, however.

When it becomes necessary to decide whether the animal is pregnant or not it can only be done positively by inspection, which can be made in the larger animals by introducing the hand through the rectum.

Delivery.—In the delivery of animals a great many obstacles are met with. When the period is complete, and the fœtus is ready for delivery, nature generally takes care of that itself. However, in many cases complications are likely to arise. I have brought with me some charts that illustrate those which are most common.

[Dr. Atkinson, by the aid of these charts, made many valuable and useful suggestions.—ED.]

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**Discussion.**

PROF. NORTH.—Can you tell us what causes abortion in cows; and is there any cure for it?

DR. ATKINSON.—Professor Nocard, of France, has made a very careful study of that subject, and seems to establish beyond doubt that it is due to a particular germ that infests the uterus. He has found that same germ in the lining membrane of the uterus, and also in the base of the brain of the fœtus. He explains how this is the germ which causes what is called the bellowing calf. It is on much the same principle as that on which Pasteur explains his hydrophobia. When the animals aborts in a stable, she should be immediately separated from the other animals, and the stable disinfected. The fœtus and fœtal membranes should be destroyed, perhaps burned. For disinfection, he prescribes a regular formula, of which carbolic acid is an important feature.

QUESTION. — In regard to breeding mares, do you think there is any virtue in inserting the arm and opening the mouth of the womb for mares that are hard to get in foal?

DR. ATKINSON.—It is possible that induration may be the obstacles to impregnation, and it might be overcome in that way. There is no doubt that some good may be accomplished by opening the *os uteri*. It may be done by introducing the hand into the vagina and passing it slowly with the fingers, or introducing the speculum. The fibres will gradually relax and the mouth expand. That may be assisted by smearing the fingers with a little extract of belladona.

QUESTION. — In case you find the mouth of the womb firmly closed, would you advise bursting it open?

DR. ATKINSON.—Impregnation cannot take place unless the mouth of the womb is open. Of course, in order to operate intelligently there should be a speculum introduced to see exactly what is the matter. You might apply force in some part that might do injury.

QUESTION.—In case of advanced pregnancy of the mare, after the milk starts, there is a common impression that at that time the colt should be

born. Have you had any experience with reference to aiding this by manipulation?

DR. ATKINSON.—No, I have not. My observation and my teaching all lead me to give nature its own course. I do not think we would be justified in interfering.

QUESTION.—Is it injurious to the mother to work her, up to a certain time?

DR. ATKINSON. — Pregnant animals should not be used for very violent rapid or heavy work in the later stages, nor should they be alongside of a wagon pole that might strike the side of the abdomen.

MR. CONVEY.—What method of removing the placenta would you recommend?

DR. ATKINSON.—There are two troubles likely to occur. One is the retention of the placenta, the other is the inversion of the uterus.

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## CARE OF THE BROOD MARE.

By A. O. FOX, Oregon, Wis.

**Demand for First-Class Horses.**—Concerning brood mares and their management, I shall speak only of their ordinary farm care, and must be allowed to draw freely from my own experience.

Before entering upon the brood mare question, I wish to say a few words about horse-breeding in general. The statement needs no demonstration "that an enormous and healthy demand exists for all horses that are each first-class of their kind." It is only the common sorts—the little low-necked, narrow-chested trotter that don't trot, and is too small and insignificant for business purposes; or the pig-headed, soft-jointed, sunken-eyed, lifeless sort of a cart horse—that will be left behind, eating their heads off waiting for a purchaser.

The American is a man of tremendous energy, and he wants his horses, like his wife, good looking, strong and energetic. In the draft horse, he does not want a great big beefy, lunk-head. He must be large, but full of character, clean-cut and flat in his bones; he must be deep in his body and muscles, and well ribbed up; he must be prompt and willing, and above all a good walker.

If a trotter, he must be not only a trotter in pedigree, but in performance, to be acceptable to the intelligent purchaser.

If a coacher or carriage horse, he must have all the essential qualities of tip-top breeding, a pleasant disposition, good size and color, with superb style and action.

**Quality, Greatest Consideration.**—Now, it is for the farmer who contemplates horse breeding, to suit his own taste, to investigate his individual resources, his capital and location, in order to determine which of these sorts are best suited to his requirements.

The splendid location of Wisconsin renders the breeding of horses one of the most certain operations that can be followed by her farmers. There will probably never be a time when a *good* horse will not sell; but I wish to extend

this timely admonition, that there is a vast amount of capital invested in this horse business, and the number of breeders are constantly increasing. The time has come when quality must be one of our greatest considerations, if we wish to keep at the head. The State of Wisconsin is not yet classed as in the front rank among horse breeding States. Nevertheless, according to our State census, the value of the horses of Wisconsin is nearly equal to that of cattle, sheep and hogs all taken together. So you see we are not alone in this business, and remember, when we stand in close competition, it is quality that will size the buyer's pile.

**The Great Key-Stone.**—As to what breed may be the most desirable, that does not come within the limit, or purpose of this paper; but as the selection and quality of our brood mares are among the essential elements which go to make our success or failure, I cannot forego one or two suggestions. I regard the brood mare as the great key-stone, upon whose strength and quality depends the lasting character of the entire superstructure. This is especially marked in the short, but resplendent history of the breeding of the American trotter. It makes little difference how well bred the sire may be, if the dam is lacking in rich trotting top-crosses, there may be little expected from the produce. It is the wanton neglect of this principle which has made disastrous so many attemps, and it is a keen appreciation of it, and close application of it in practice, which has marked the success of other of our more advanced breeders. This same principle holds good all down the line. No matter what sort of horses we wish to produce, we must look for the prime factor in the dam as much, if not more, than in the sire. Let us, therefore, look carefully to the character of our mares; let us begin the weeding process and reserve for future breeding purposes only such as conform most nearly to our desired type. With such definite purpose in view, we can not fail to produce horses which will always be sought at top prices.

**The Index of the Nerve.**—A sluggish, lifeless sort of a mare will never produce much of a colt. She must have nerve, muscle and endurance. This is fully as necessary in a draft mare as in one designed for breeding roadsters or coachers. The bold, prompt walk, the index of the nerve, is of all the most serviceable gait. Without this quality, any horse, for whatever purpose bred, is at best a mere "dogan."

**Getting in Foal.**—Now, in reference to the management of our mares, we will first undertake to get them in foal. (Right here arises the many important questions relative to the care and management of the stallion, but as it does not come within that portion of the subject which has been assigned to me, I must leave it for others to discuss.) In Wisconsin, the majority of the mares are bred in spring. I do not approve of breeding earlier than May 10th, as my books show that the majority of mares bred prior to that time have been returned. The reason is probably found in the inclement weather, and a lack of that open condition of the mare's system which seems necessary to conception. I do not approve of breeding any mare that has not been a regular breeder, until she has been run to grass from three to six weeks, and has become what is ordinarily called "grassed out." I then take her up and put her to harrowing or plowing corn for a week or more, until she looks a little down in flesh; she is then given light work, or even complete idleness, in a box stall or paddock, giving

her three full feeds a day of oats. In a short time she will begin to feel very bright and playful and to take on new flesh.

Just at this time she should be carefully observed, and upon any indication of heat, should be allowed to see the horse, and to be teased a little, but not to aggravation. I would "fire" a groom at once who would stand idle and let a stallion go to chewing up a mare. The stallion should work at the neck, back and loins never under the tail or at the nose, the latter being a frequent place of transmission of distemper and various nasal diseases.

If the mare is found in season, don't breed her until satisfied that the heat is well upon her. Then before breeding her, the mouth of the womb can be easily examined with the hand. If found closed, it must be carefully opened with the fingers, and treated with any simple penetrating oil, sweet oil or melted lard. In case of much contraction, we have used an ointment of belladona with good success. After receiving the horse, she is better tied up for the day in a dark, quiet place, with plenty of fodder to pick at, so as to divert her mind from herself. I do not approve of a long drive after breeding, although a short warming up before service may be of some use.

This may not be considered scientific treatment, but it has been attended with marked success upon our farm, and with some mares that had for many years been considered barren. After being bred, we now try to favor the mare for the next 21 days, to her first trial (we try our mares on the 21st day after breeding); if not found in season we then try her once a week for four consecutive weeks, after which, if not found in season, she may be considered in foal.

Working.— Meanwhile she goes into a regular work team until the bulk of the fall plowing is over. We then turn out to pasture all the mares that are supposed to be in foal, and leave them there until the middle of February. I think, as a rule, in the attempt to do well by our mares, many of us are apt to give them the very thing which should be withheld from them.

Winter Feeding Periods.— Our winter feeding periods last six months, during which time our mares are dependent upon whatever provision we may have previously made for them. They are usually stabled too much, and fed too much grain and other concentrated food; their blood becomes thick, and a general condition of congestion throughout the whole system follows. They become sluggish and inactive. The result of this folly is told the following spring, when the colts begin to come weakly, sickly and dead.

To Avoid Losses.— To avoid these losses we must furnish abundance of exercise, with mild laxative kinds of food. During my first experience with brood mares, about 13 years ago, we used to breed three to five mares annually, and from these we usually raised about two colts. We have good, comfortable barns The mares were worked hard and fed liberally on hay and grain. During the winter, if not worked, they were let out to exercise in the cow-yard day-times, and taken up nights. In spring, at foaling time, the foals would come large and limp as a dish-rag. More than half of them died. I like to see a colt come like a good lamb—thin and bony, but vigorous and lively as a cat. They will then take on all the necessary flesh, as they are possessed of vitality and strong digestion. This vital condition of the foal is largely governed by the habits of life of the dam, as well as by her temperament. We must, therefore, elimi-

nate from her surroundings such forces as tend to these unprofitable results.

**Exercise.**—In the first place, I regard absolute freedom of exercise as imperative. That kind of exercise which she gets by being let out of the barn occassionally is not of much account, and may be, at times, a source of serious trouble, because of her disposition to run and play and caper about, and of other beasts to quarrel with her.

**Feeding.**—Too much concentrated food, too generous keep and too nice and comfortable stables are the sure forerunners of disaster to brood mares. The plan which, in my experience, has given the best net results, is to turn the mares out early in the fall, so that they may get thoroughly accustomed to it. Then, instead of taking them up when winter sets in, we turn them into a field of reserve pasture, composed principally of blue-grass, or June grass, which has been previously set apart for them about July 1st. They are very fond of this feed, and keep in good condition on it. This reserve pasture is located near timber, in which the mares find their principal shelter. They soon learn to paw away the snow from the long cured grass underneath, and help themselves. Here they usually remain until about the middle of February, when the snow becomes so hard and crusted that they can not get to the grass. We then take them into large yards, in which are located common open sheds. In the middle of the yards are covered mangers, each of which holds one good load of straw. We fill these as often as required with oat straw, and supplement this with corn fodder. Towards the latter part of the winter we also feed ground oats and bran freely. When near foaling time, each mare is removed to our breeding barn, which is centrally located to three or four small fields or paddocks. In these paddocks they are always within close observation of the man in charge, and here they receive their daily exercise, with plenty of soft, nourishing food until the foals are about two weeks old. They are next turned into a field adjoining the railroad, where the foals become car-broken before they are a month old.

**Diet.**—The item of diet is very important, as it goes largely to determine the condition of the digestive organs of both dam and foal at foaling time. Anything approaching a heating or corn diet is absolutely destructive to both. Bran, crushed oats, oil-cake and moderate quantities of tame hay are among the best of foods at this particular critical period of foaling. Avoid the use of clover hay and rye meal. Unless the mare foals late in the summer she must have a good, dry, level bed to lie on; this simple precaution will tend largely to avoid bowel trouble in the foal, on account of getting damp or chilled. The closest of care should be given to the condition of the bowels of the colt for the first 48 hours after birth. Avoid allowing it to fill up with milk at one time—a little taken often is much the safer plan.

### Care of Foal.

**The Bowels.**—As soon as the colt stands and begins to run about the mare and suck freely, then the bowels must move freely. They ought to move within 6 to 8 hours after birth—this is imperative. The first excrement is very gummy, and it is sometimes impossible for the colt to void it without assistance. The straining brings on inflamation of the bowels very rapidly. The outward indications of constipation are switching of the tail, pointing toward tha flank with the nose, labored

and quickened breathing, with heaving of the flanks, and uneasiness of the hind legs. I have found the safest plan is to make it a rule to inject each colt during the first half day of its life, with about half a tea-cup of raw linseed oil in a pint of warm castile soap-suds; or warm molasses and cream, mixed half and half, will answer the purpose. If in great pain it may be allayed by an injection of half a teaspoon of laudanum in a tea-cup of warm water, and outward applications of hot flannel cloths or mustard and vinegar paste rubbed into the hair on the belly. Laudanum must not be given to a new born foal, through the stomach unless the bowels are free and open.

**White Scours**—During the first two weeks the foals are apt to be attacked with the white scours, especially if the mares have been kept in high flesh through the winter and foal early in spring. This is a very fatal disease and must receive prompt and careful treatment. The symptoms are generally a sour, white, watery diarrhœa, white fur on the tongue; irregular appetite, sometimes very ravenous; dry unthrifty skin. If the mare has been kept up on dry feed give her a dose of raw linseed oil with a tablespoon of laudanum. If the colt has good strength, I have found the following treatment very satisfactory:

When the first scour makes its appearance give, through the stomach, in a half tea-cup warm water, one flowing teaspoon of pure castor oil, 20 drops laudanum, ½ teaspoon carbonate of soda (or common baking soda). Apply at once on the outside of stomach and bowels a mustard pulp made by mixing mustard and vinegar into paste; rub into the hair with the hand or a flat stick; if the mustard is old or weak sprinkle a little cayenne pepper into it. The object is to heat but not to blister. Flannel cloths wrung in hot water will do, but require more attention, and the colt is apt to take cold after their removal. After the oil has operated and emptied the bowels, then give the following:

Make a tea of the inner bark of white oak. Give ⅓ tea-cup white oak tea, 20 drops laudanum, ½ teaspoon carbonate soda. This dose may be given 3 or 4 times daily until the bowels are checked. Care must be taken not to stop the bowels abruptly, the object being only to have control of the bowels and check them gradually.

**Give Little Medicine.**—Do not give any more medicine than is absolutely necessary. The colt should be kept from sucking too much, as most of the milk it takes is not digested, and only goes to clog up the stomach and bowels again making more trouble. The easiest way to manage this is to keep the mare milked out as dry as possible by hand. If the colt is weak, when it begins to mend a tonic may be given, composed of tincture of gentian one part, whisky one part, ginger tea four parts. Dose of mixture, one-half tea cup, three to five times a day. If stomach is still sour, add a little soda. We pay close attention to these small details for the first few days of the colt's life, and then he is generally no further trouble.

**Results for Six Years.**—This is, in substance, the plan which we have followed for the past six years, with particular reference to cheap management, and practical net results in strong, living foals. We have annually about 20 to 25 mares to foal, and our total loss of foals at birth, either foaled dead or dying from weakness immediately following birth, has been for the past three years just one colt per annum.

**Ensilage.**—To those who may not be so situated as to be able to furnish the

above pasture, there may be a substitute for the green ration there supplied, in the use of ensilage. Of this I can only speak from observation, which is to-day in a very superficial form. I have this winter seen some 300 horses being kept on almost an exclusive diet of ensilage and oat straw. The ensilage was the B. & W. sort, very juicy and quite sour to the taste. I have never seen store horses in winter with softer, nicer coats than these; but it is yet quite a question whether this is just the right sort of food for the brood mare, and for the development of a strong, bony fœtus.

**At Weaning Time**—We find it most desirable to teach the colt to eat bran and oats by its mother's side before separating them. The colt will then wean easily without loss of flesh.

**Maturing.**—Now that we have our colt the next question is, what shall we do with him; what shall we make of him; for what purpose shall we mature him? I think the demand of our best buyers (those who pay the top prices) is for a large, active horse, with clean, flat bone, and well-muscled throughout; that while size is one of the prime considerations it is second to quality and finish. Assuming this to be the fact, then how shall we feed and mature our colts, so as to conform to these requirements? How are we to avoid the beefy, lifeless, soft-jointed, round-bone sort? If we expect to develop the bones and muscles of our horses to the greatest strength and soundness, we must see to it that our colt's food is of the bone and muscle-forming sort. My favorite ration for weanlings through the first winter is equal parts by weight of oats, corn and rye, or barley, ground together and mixed with one-third bran, by measure. In addition to this, I feed good hay. When first weaned, we feed four times a day, beginning about 5:30 in the morning and dividing into four equal periods. This plan is kept up until about Christmas, when we drop to three feeds a day, keeping up or perhaps increasing the daily ration. This winter I have, for the first time, begun feeding ensilage at noon. (The ensilage is made from the ordinary dent corn, fully matured.) I have nothing to say in its favor yet, as it is purely experimental.

**Water—Exercise.**—Weanlings ought to have a constant supply of water before them in order to drink, as has been their former habit when with their dam, "a little and often." My weanlings are allowed to run at liberty day-times, and at night they are shut up in the barn. A few tops of poplar trees, in convenient places for them to go and nibble the branches, are much enjoyed by the colts, and much disliked by any worms which may infest them. In this manner they are carried through the first winter.

**The Second Winter,**—When they are yearlings coming two, they are kept in feeding lots provided with open sheds and covered straw racks. They are fed twice a day. The first feeding in the morning is corn fodder without ears, usually thrown in bunches on the ground, as we find that in fair weather they eat it cleaner in this way than any other. At noon they get a liberal feed of corn or oats and bran and as much oat straw or hay as they will eat clean before night. At night, if cold and stormy, they are given a little more hay or straw. The treatment for the third winter varies according to the purpose the young horse is about to fill, some going among the brood mares, some into the yards to finish the breaking and some to be stabled and fitted for market.

**Breaking.**—In breaking our colts we use the little Jockey cord in its various forms, our system being mainly that of

Prof. York. We have not used a bitting rig for ten years, nor would I allow one in use on my farm. Our constant endeavor is to breed the necks up, rather than to try to raise them up by mechanical power; but if high checking must be resorted to, we prefer to do it with the ordinary bridle and by slow degrees. We break our colts single first, in a low cart made of white oak grubs, after which they are driven double by the side of a gentle mare.

Colts should be thoroughly handled before they are a year old, halter-broken, and taught to lead up promptly, and their limbs all handled. They will be pleasant and tractable always afterwards, and right here is one of the chief secrets of having gentle horses. Find me the farmer who always handles his colts when weaning, and I will warrant you will find a lot of gentle horses about him, and, furthermore, a year ahead of those of his less careful neighbor.

Marketing.—When we are ready to market our horses, let us do it as our trusted merchant sells us a suit of clothes. Let us represent them just as they are. The dealers will soon find us out, and we will more than make up on the sale of our best horses what we may have sacrificed by telling the truth about the poorer ones. Then, when we meet the grim face of death, and pray to God to save our souls, and begin to hunt around to find them, we shall not be confronted by the awful apparition that we have sold our souls to sell a horse.

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## BREEDING DRAFT HORSES.

By S. D. THOMPSON, Wayne, Ill.

A Growing Industry.—Draft horse breeding is a growing industry that is rapidly assuming a prominent position among the agricultural pursuits of the Northwest, and especially in Wisconsin, with her great pineries and ore fields to the North, and four of the most important cities of the nation adjacent to her borders—sources of demand that can be depended on at all times, to offer a market for high quality draft and carriage horses. With this great demand open before the people of your State, but slight attention has been given to the breeding of draft horses, except in a very few localities, until within the last five years. There are, however, unmistakable evidences of a growing interest commensurate with the importance of the industry which has manifested itself in the eagerness of the people for information as to the best breeds to accomplish the desired purpose, and also the readiness with which all breeds of heavy horses offered upon the market have found purchasers, regardless of their adaptability to your uses.

The Loss From Breeding Trotters.—The general farmer cannot afford to breed for speed, for do we not all know that breeding a "real trotter" is a chance result, a bit of gambling luck, a fortunate ticket from the lottery whose wheel in revolution throws out a hun-

dred blanks to one numbered card? Now and then comes a prize—a trotter that trots down in the "twenties," or below, and the press of the country heralds his fame, and the fame of his breeder or owner; but the press, I notice, does not tell the miserable story of the multitudinous failures which came before and after the one brilliant hit; of the thousands of dollars, the years, the study, that were spent in the effort to produce the one trotter; and of a landscape full of colts and horses that could neither trot in "twenty" nor anywhere else to the watch that gave them any value, and which could not "road" twelve miles an hour for three hours together on a country road, to save their own lives or that of their breeder. Verily, what a farce and loss this wild, frenzied effort on the part of our people to breed trotters has been. The loss from this unbusinesslike ambition has fallen heavily enough on the breeder himself, as all who understand anything of the subject know, but the private loss is as nothing to that far heavier one which has fallen, because of it, upon the country at large.

**The Roadster and Coach Horse.**—The general farmer cannot afford to breed for speed, but if it is his desire and ambition to breed to a light horse, there are two styles of horses for which there is a genuine and earnest demand in this country to-day, and for this demand there is no supply, and no source of supply. The first is the roadster, and the second is the coupé, or coach horse. The former must be of good size, handsome to the eye, docile, and able to pull two persons from ten to twelve miles an hour, and burst out, when called upon, to a three-minute gait. The latter must be of larger size, of fine form, of good, solid color, gentle in stall and harness, of high, showy action, and able to pull a coupé or carryall eight miles an hour. Such horses will sell at good prices, and whoever breeds them will find himself breeding to a profit, and a good round one at that.

There is in France a race of horses, some of which have been imported to this country, which crossed on our native stock will, I believe, give us the people's horse, or the horse of the future. His appearance is noble, his form handsome, his temper gentle, his spirit high, and his blood, through many clearly-defined and well-known channels, flows clean and straight from the desert. Centuries of governmental supervision and controlling authority have placed his pedigree beyond dispute, and made him the embodiment of prepotent forces, to a degree unmatched in the world beyond the limits of the Arab. From the use of these stallions I premise that, in a few years, the finest carriage horses in the world, and a noble class of roadsters, will be seen on our city and suburban roadways, and the breeders of the country will have what they need—a horse that will sell, and sell for a good price, and sell as soon as he is educated to go safely to harness. That is the kind of horses gentlemen want and are ready to pay for.

**The Wants of the Yankee.**—I am assured that the farmers of Wisconsin are clearly convinced that they must breed heavier horses; that the only information that they want is to know what breed of stallions to buy in order to produce the best horses for the market they have to supply, as well as to perform the labor to be done on their own farms.

The wants of our people are peculiar to themselves, as no country is exactly like ours. The rapidity with which everything moves is a marvel to all who

have not become Americanized. The civilization which we Americans are building up on this continent is such as the world never saw before. At least, neither the history of letters nor that written fragmentarily in ruins, gives us the least hint of one like it. The base of it is material development; above this, as a foundation, is a mental development wholly unprecedented.

Hitherto, electricity has been of the earth and air; in the American it is incorporated. Lightning in the clouds is an old thing, but lightning in human brain-cells is a new thing under the sun. As Lowell says, in Bigelow Papers: "They didn't know everything down in Judee," and Solomon, wise as he was, never mentally forecasted a Yankee.

As business men, we all belong to a "fast set." We eat fast, drink fast, drive fast. There is, therefore, a certain poetic harmony in the way in which we come into the world, act in it and get out of it. There is not a slow pulse in an American. He is all vitality. He thinks as he eats, and is a mystery to himself, for not one of us can tell ten minutes after eating, what we have swallowed. An American is like an arrow in full flight, flying so fast that he sets himself on fire and burns himself to ashes by the fierce rapidity of his own motion.

That everything to succeed, must adjust itself to this high-pressure principle, no one will deny; therefore, in prosecuting our research for information, it is indispensable that we keep our peculiar methods in view, and the natural conclusion will be that the breed of horses that can most nearly approximate our ways, is the one that will ultimately succeed; whereas, the lymphatic, sluggish or inactive breed will surely fail.

Let us then for a moment examine the characteristics of the different breeds of draft horses that are being imported into this country, and it is certainly fair to accept the descriptions of well-established authorities of the countries in which the respective breeds are bred.

**The Suffolk Punch**—Youatt, who is an accepted authority on matters pertaining to English horses, says of the British breeds: "Horses for slow draft and sometimes for the carriage are produced from the Suffolk Punch, so called from his round, punchy make, and descended from the Norman stallion, and the Suffolk cart mare." The true Suffolk, like the Cleveland Bay, is nearly extinct. It stood from fifteen to sixteen hands high, of a sorrel color; was large headed, low shouldered, and thick on top; deep and round chested; long backed; high in the croup; large and strong in the quarter; full in the flank; round in the legs and short in the pasterns. It was the very horse to throw his whole weight in the collar, with sufficient activity to do it effectually, and hardihood to stand a long day's work.

The present breed possesses many of the peculiarities and good qualities of its ancestors. It is more or less inclined to a sorrel color. It is a taller horse, higher and finer in the shoulders, and is a cross with the Yorkshire half or three quarters bred. The immense power of the Suffolk is accounted for by the low position of the shoulder, which enables him to throw so much of his weight in the collar. Although the Suffolk Punch is not what he was, and the Suffolk and Norfolk farmers can no longer boast of plowing more land in a day than anyone else, this is undoubtedly a valuable breed.

**The Clydesdale**—Is a good kind of draft horse, and particularly for farming, and in a hilly country. It derives its name from the district of the Clyde in Scotland, where it is principally bred. The Clydesdale owes its origin to one of

the Dukes of Hamilton, who crossed some of the best Lanark mares with stallions which he had brought over from Flanders. The Clydesdale is larger than the Suffolk, and has a better head, a longer neck, a lighter carcass, and deeper legs; strong, hardy and pulling true.

The Southern parts of Scotland are principally supplied from this district, and many Clydesdales, for agricultural purposes, find their way to the central, and even southern counties of England. Dealers from almost every part of the United Kingdom attend the markets of Glasglow and Rutherglen.

**The Heavy Black Horse**—Is the last variety it may be necessary to notice. It is chiefly bred in midland counties, from Lincolnshire to Staffordshire. Many are brought up by the Surry and Berkshire farmers at two years old, and afterwards send to the London market.

These horses are adapted more for parade and show and to gratify the ambition which one brewer has to outvie his neighbor, than for any peculiar utility. They are certainly noble looking animals, with their round, fat carcasses and their sleek coats, and the evident pride which they take in themselves, but they eat a great deal of hay and corn, and at hard, long-continued work, they would be completely beaten by a team of active, muscular horses, an inch and a half lower.

The only plea that can be urged in their favor, besides their fine appearance, is that as shaft horses over the badly-paved streets of the Metropolis, and with the immense loads they often have behind them, great bulk and weight are necessary. Weight must be opposed to weight, or the horse would sometimes be thrown quite off his legs. A large, heavy horse must be in the shafts, and then little ones behind him would not look well.

**The Flanders Cross.**—All our heavy draft horses, and some of the lighter kind, have been lately much crossed by the Flanders breed, and with evident improvement. Little has been lost in depth and bulk of carcass, but the forearm has been raised, the legs have been flattened and deepened, and very much has been gained in activity. The slow, heavy black, with his two miles and a half an hour, has been changed into a lighter and yet exceedingly powerful horse, who will step four miles in the same time with perfect ease, and has considerable more endurance. Sidney, Manager of the Agricultural Hall Horse Show, in his book on the horse, says:

"According to the agricultural writers at the commencement of the present century, there were distinct breeds of draft horses in at least half a dozen English counties. At present, all such distinctions have been effaced and until quite recently it was only the exception that the purchaser of a plow or wagon team made any inquiry as to breed or pedagree, unless it was of the Chestnut or Suffolk breed."

**The True English Draft Horse.**—For all practical purposes, the true draft horse of England, may be classed into the London Dray, the Shire horse, the Clydesdale and the Suffolk Punch, the Cleveland Bay having become extinct or nearly so

It is only within a few years that the Scotch have taken the lead in establishing a Stud Book for Clydes, and it was not until the year 1778, that the breeders of Suffolks followed the sound example.

The Shire horse is the final result of the improvement of agricultural horses commenced early in the first half of this century. He is found in the Shires, where the strongest class of plow horses

are required—a breed (if it is a breed) which has superseded the Lincolnshire black horse.

As late as 1840, Mr. Burke, who was one of the editors of the early volumes of the Transactions of the Royal Agricultural Society of England, wrote in a note on cart horses: "A Lincolnshire black of the pure breed stands foremost in the rank of every cart-horse race in the Kingdom."

These are not my words, but come from the highest authorities in England. They claim nothing more for these horses than simply heavy draft at a walking pace; they are not made to move fast.

**The Clydesdale,**—As a breed, is but a descendant of the heavy Dutch horse, and from him has inherited his lymphatic nature, and slow-going pace, and the Shire horse, according to the highest English authorities, is scarcely a breed at all, being simply a modification, through the Clydesdales, of the heavy Lincolnshire black horse that Youatt says, "were adapted more for parade and show and to gratify the ambition that one brewer has to outvie his neighbor, than for any peculiar utility."

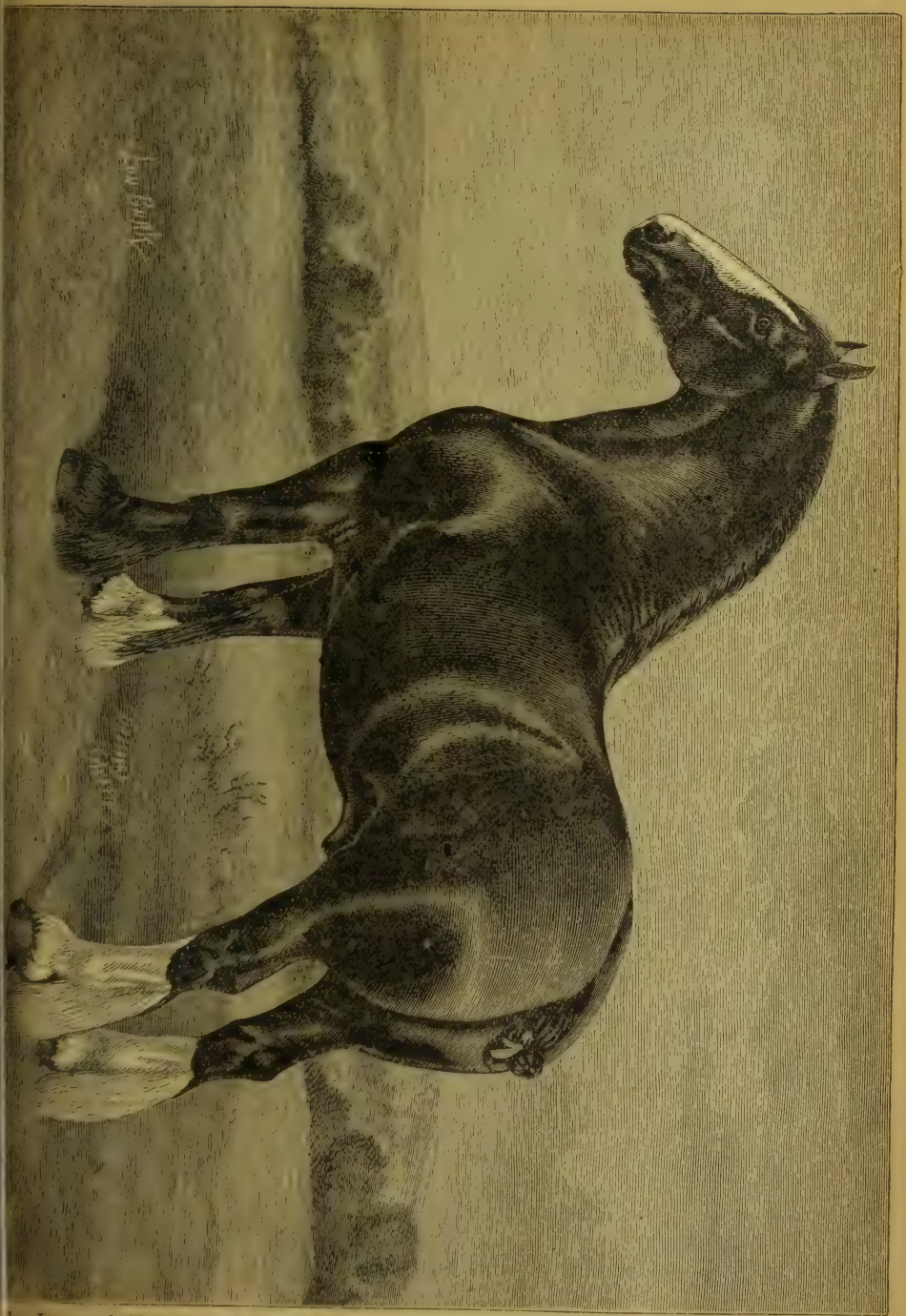
The Percheron.—Certainly, with our peculiar methods of doing business, neither of these horses is adapted to our uses; but there is a breed of horses that fully meets the requirements of our people, and that is the quick, active Percheron. Although English and Scotch horses have been much the longest on the market, the Percherons have completely superseded them in popular favor, as is shown by the unimpeachable evidence of nearly all the city buyers, verifying the oft-quoted saying of the great Talleyrand, that "nothing succeeds like success." Charles Du Hays, the veteran French equine historian and master of the horse under Napoleon III, says of the Percheron:

"To no ordinary strength, to vigor which does not degenerate, and to a conformation which does not exclude elegance, it joins docility, mildness, patience, honesty, great kindness, excellent health and a hardy elastic temperament. Its movements are quick, spirited and light. It exhibits great endurance, both when hard worked and when forced to maintain for a long time, any of its natural gaits, and it possesses the inestimable quality of moving fast with heavy loads.

"It is particularly valuable for its astonishing precocity, and produces by its work as a two-year-old more than the cost of its feed and keep. Indeed, it loves and shows a real aptness for labor, which is the lot of all. It knows neither the whims of bad humor or nervous excitement. In the Percheron, we recognize the heavy Arab, modified and remodeled by climate and peculiar circumstances. He has remained mild and laborious, like his sire. He is brought up like him, in the midst of the family, and like him, he possesses, in a very high degree, the faculty of easy acclimation. He acquires this, in the midst of the numerous migrations in the Perche, the counterpart of those that the type-horse makes upon the sands of the desert. A final comparison, which, perhaps, has not been sufficiently noticed, is that, like the Arab, he has no need of being mutilated in order to be trained, managed, and kept without danger. In a word, the Percheron, notwithstanding the ages which separate them, presents an affinity as close as possible, with the primitive horse, which is the Arab."

Professor Andre Sanson, of the National College of Agriculture and National Institute of Agriculture of France, says:

"The Percheron is a draft breed of the most superior quality, and for this reason it enjoys an enviable reputation. It possesses an active, quick, energetic temperament; the right one to pull heavy weights at a rapid gait. Fast steppers are common in this race. Before the establishment of railways, it was this breed that was used for our stage coaches and diligences. Now-a-days it is used more than any other for



he Imported Clydesdale Stallion GO AHEAD 4105 (5052), property of Galbraith Bros., breeders importers, Janesville, Wis. See page 284.

our omnibuses. Its great feature is rapidity combined with great strength. This is the reason why the Percherons are sought after by all the nations who are trying to improve their draft horses or to create a breed for themselves.

"Indeed the Percheron is one of the breeds that enjoys in Europe, and even in the whole world, the highest consideration. It has, on account of its incontestible merit, carried all over the world the fame of the little French province where its nearest center of production is to be found. This fame of the Percheron horse is only to be compared with the thoroughbred horse of England, for the Percheron is to the draft breeds what the English Thoroughbred is to the light breeds—a generator and improver."

Another noted French writer says:

"The Percheron is a breed that has been moulded to the necessities of the different periods of its existence for hundreds of years. Under the vivifying influences and climatic effects of the Perche, as well as by the inimitable processes of educating both males and females from the earliest age, and with the most judicious care possible, by the actual performance of the work they will be called upon to do during their lives; thus, slowly and surely developing their physical capabilities and instinctive aptitudes into hereditary and transmissable forces, which have been exerted with such prepotent power in the amelioration of all races with which it has come into contact."

The Percheron to the Front.—The Clydesdales and Shires were imported to this country and Canada, many years ago, but the demand of our people for a horse of equal substance and bone, and more activity, caused the Percheron to almost supersede the British breeds, as is shown by the evidence of the accumulated knowledge of years of experience of those who perhaps furnish 40,000 of these horses annually to the people who wear them out.

Bahlman, Murback, Chamberlain, Oakly & Smith, Hayman, Stein & Co., New York, Newman & Ritchey of Brooklyn, Heinaman of Mansfield, Ohio, Henry, Newgass, Cooper & Lamb of Chicago, all state their emphatic preference for the Percheron. They say they are possessed of more endurance than any other breeds, give good satisfaction, and wear well; have better feet; last better on our pavements, and are more easily acclimated than any other breed. This is not the evidence of men handling one or two horses, but men who handle thousands annually.

Ten Thousand Imported.—Ten thousand pure-bred Percherons have been imported in a very few years, and although a number of English and Scotch horses have recently been imported, but few of the produce of later importations have had time to go upon the market, or in any way demonstrate that they are superior to the English and Clydesdale horses bred in this country years ago, and which were displaced by the Percherons. The British breeds are perhaps suited to the British people, and their British ways of doing things, but, as I remarked before, there is not a slow pulse in an American, and he don't want any slow pulses in his horses, and this will be more and more felt as you breed up. As the mares become larger, the more necessary it will be for you to cross them with strong, active stallions; otherwise, you will, in a short time, possess a heavy, clumsy race of horses, fit, as Youatt says of the Lincolnshire black, only for parade and show. If you want a quick, active worker, one that can do a day's work and come up smiling at night, breed your mares to the Percheron.

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**Discussion.**

QUESTION.—What horse do you breed principally?

MR. THOMPSON.—I am Secretary of the Percheron Horse Breeders' Association and the French Coach Horse As-

sociation, and represent a number of breeders who breed those horses.

MR. GORDON.—What is the difference in weight of the standard-bred Percheron of forty years ago, and that of to-day?

MR. THOMPSON.—They are breeding them much larger. It is a mistake that is being made. You have a big horse weighing 2,000 pounds with less activity, and you can't help it. Forty years ago the horse of the Perche would not weigh more than 1,500 pounds.

MR. GORDON.—Wasn't it owing to the demand from America for a large horse that has caused breeding in that direction?

MR. THOMPSON.—That is the only reason, sir. The demand for the heavier horses in America has caused them to breed heavier animals, and I think it detracts from any breed if you make them too large.

MR. VAN DUSEN.—Isn't it your judgment that that demand is going to see its best day very soon, and that we are going to come back to the 1600-pound horses?

MR. THOMPSON.—I think that people will soon see the error of breeding to 1,900 and 2,000-pounds-weight horses.

PROF. HENRY.—What do you consider the best weight for draft horses?

MR. THOMPSON.—We have bred up these horses from very small ones. We have a lot of good-sized mares here now, and a 1,700 or 1,800-pound horse is fully heavy enough to cross on any of them.

MR. MCKERROW.—Isn't it true that a team of first-class quality, weighing 3,000 pounds, will sell equally well with a team 400 pounds heavier?

MR. THOMPSON.—They will sell more readily on the market.

QUESTION.—Is there any difference between the Percheron and the Norman?

MR. THOMPSON.—There is no significance in the term Norman as applied to the French horse in France. There is no breed known there as Normans. Some of the earlier importers, either through ignorance or something else, called all breeds of French horses Normans. As a matter of fact they are called after the district in which they are bred. These people went over there and bought some in Normandy and called them Normans.

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## THE FARMER'S HORSE.

By JOHN M. TRUE, Baraboo, Wis.

**The Horse the Markets Demand.**—The profitable horse for the farm must combine a good degree of adaptation to the required farm work, with qualities that demand recognition in the best markets. A small proportion of the horses produced on the farm are required for continued farm labor, but it is a fortunate fact that the best and most reliable markets call for such horses as may be produced from a class of mares best adapted to the diversified wants of the farmer. No clear-sighted breeder will be contented to raise the animal that in common parlance is denominated the general-purpose horse. He is a compromise between the two types that are required to furnish three-

fourths of the market requirements, and fails to give, in any considerable degree, the distinctive merits of either. The idea that the horse that at maturity will weigh from 1000 to 1300 pounds, possessing a semi-draft, semi-roadster formation, but wanting the weight of the former and the style and action of the latter, is a typical horse for the farmer to breed is a delusion and a snare. This idea has sacrificed the best available blood in the country, ignored the demands of the best markets, and filled the land with unsalable, because undesirable, stock.

**Appreciation of the Morgan.**—Had that appreciation of the grand old Morgan that now seeks to gather up and strengthen the scattered remnants of that family, found proper expression and action fifty years ago, much valuable effort would have been spared, and a well defined and valuable breed of horses, peculiarly American, would now be in our hands. But blind to the requirements of the principles of breeding, by illy-advised crosses, even in the original home of this now much prized horse of our fathers, very few animals are now found possessing strong indications of the old Morgan stock.

**In the Way of Successful Work.**—This same disposition to mingle bloods, to ignore line breeding, and to cater to the general-purpose idea stands squarely in the way of the best results with the average farmer of to-day. The cheap grade, the miscellaneously-bred scrub, and the little roadster sire debars the horse-breeding farmer from successful work. With indifferent stock now on his hands, the future holds out no inducements to his misdirected efforts. The only financial idea that his mind seems capable of grappling with, is the difference between five and twenty dollars in the price of the service of the sire. He is blind to the fact that his neighbor readily sells his surplus stock for twice the money that he vainly seeks to get for his own. He does not realize that it costs as much for him to raise his unsalable product as it does his neighbor to mature his better-bred colt, and fails to see that the difference in profit between them is merely the price of the intelligent thought and skill of his competitor.

**Results of Systematic Work.**—It is a matter of much satisfaction that systematic work is making rapid strides in developing and fixing the type of our grand American-bred roadster, and in the near future we may confidently expect that in this class speed, to a reasonable extent, may be as surely bred as form and weight in the draft class. This is being attained by a recognition of blood lines, and breeding from standard-bred sires and dams.

**Breeding for Speed Only.**—The general farmer will find little time and small inducements for engaging in this expensive and skilled department, where speed only is sought and other qualities ignored. This breeder and handler, like the horse he pins his faith to, if he makes a success of his work, must be "one in a thousand."

**The Farmer's Roadster.**—The combination of speed, style and weight, so often found in the roadster stallion of the present, gives us an animal entitled to the careful consideration of a class of our farmers. A standard-bred roadster stallion of superior style and finish, and weighing in proper condition 1200 lbs. or upwards, is a grand acquisition to a community of discriminating farmers. From such a sire, and well-bred clean-limbed, good styled roadster mares weighing 1100 lbs. or more, a class of colts should be produced that will always be in demand

for carriage work in our cities, as well as adapted, to a certain extent, to the wants of a class of our farmers. In many parts in our State I find a large number of mares good enough to breed roadsters or carriage horses from, while in other parts there is almost a total lack of such material. The attempt to breed roadsters from grade draft mares should be discouraged. The farmer's roadster should have form, size, style and sufficient speed to render him an attractive, pleasant driver, though a 2:40 "clip" is less important than a "trappy" movement necessary to perfect the stylish driver.

**The French Coacher**—Is strong in the desirable points of the carriage horse. In attractiveness of form and movement he is a remarkable exhibition of the skill and intelligence of French breeding that first gave us the Percheron, and now with the additional Coacher promises to fill the measure of the requirements of the American breeder to a remarkable extent. He only needs to establish his power to transmit his excellent qualities when bred upon our mixed-bred mares. No animal can displace the draft horse from its strong position as a horse-motor in the work department of the civilized world.

**The "Big Horse" Industry.**—Regardless of misrepresentation, ridicule, and a general lack of appreciation, the "big horse" industry in our country has within the past ten years outstripped any other live stock venture in importance and financial success. Remarkable as has been the development of this work, equally remarkable has been the constant and undiminished demand for its product. A complete revolution has been effected in the scale of weight in our work horses. Where, ten years ago, 1200-pound horses were tolerated, now 1400 or 1600-pound animals are required, while greater weights command larger prices. The farm, the mines, the lumber woods, and the cities, call for such horses as can be produced by crossing our strongest, heaviest-boned mares with full-blooded draft stallions. These grade colts are raised as easily and surely as steers, make the best of returns for feed given, are orderly and easily handled, and susceptible of early maturity. When, at three or four years of age, they go upon the market, they give a percentage of profit equal to any stock investment on the farm.

**Good Prices Obtained.**—The strong point in the heavy horse industry is the uniformly good prices obtained in the aggregate of sales. The brood mares best adapted to the production of heavy colts are those best suited to the largest requirements of our farm work. Indeed, the grade draft weighing 1400 pounds comes nearest to my ideal of a farm horse. The farmer's mare may be, then, the animal fitted for the performance of farm labor by formation and size, and may also combine qualities that, when she is judiciously mated, will produce colts that are in demand at highly remunerative prices.

**The Degree of Success.**— The largest profit clearly lies in raising either carriage or draft horses. The degree of success will be dependent upon the adaptation, intelligence and skill of the breeder, manifest in his judicious choice of the line of horses he will breed, the careful selection of sires, and the proper handling of breeding stock and colts. It is fortunate when communities of farmers can unite in raising the same kind of horses, as by the number and uniform quality of the stock offered, buyers are attracted and better prices are obtained. I have endeavored to show that my farmer's horse is not the mythical gen-

eral-purpose nag. The horse market is not exempt from the general conditions which, with a close competition, surround all our farm enterprises, and in common with other lines of work, success lies only in the path of intelligent, persistent work, that will place our product beyond general competition by virtue of its excellence. So the farmer's horse must be bred for a special purpose, and that purpose the putting of the most possible money in the pocket of the owner. The poorest results, in individual cases, that may come from such work will still be superior to what may be expected from the thoughtless and penurious methods of the past.

# RAISING SHEEP FOR MUTTON.

By GEO. McKERROW, Waukesha, Wis.

**A Wide Range in Prices.**—If you have noticed the mutton markets for this past six or eight years, as I have done, you will notice that the range of prices quoted in Chicago, New York and other markets has been widening. During the past winter sheep have sold in the stock yards at Chicago, all the way from $2.00 to $7.00 per hundred.

Now, is it the Merino sheep that are bringing this seven dollars per hundred? I answer, no. The best lot of Merino wethers that I know of sold in Chicago at about five cents a pound, while I know of two at least, if not more, lots of grade mutton sheep that were sent in from the State of Wisconsin, that have sold for over six cents per pound on that same market. I believe in breeding to a purpose, but as a dairyman breeds up his herd to a Jersey or Guernsey or Holstein standard, so the sheepman can grade up his sheep toward a Downs standard or a long wool standard.

**Sheep Giving Good Results.**—I meet many sheepmen, and men who are following diversified farming, who have sheep and cows and horses and hogs, and they all tell me that the sheep are and have been giving them as good results for the past two or three years as any of their other stock. I know of but one experiment that has been tried on this side of the Atlantic to find out how cheaply mutton could be produced, and what profit there was in producing mutton, and that was carried on at the Ontario Experiment Farm, under the direction of Prof. Wood, for a period of five years. He experimented with all the pure-breeds; but to bring it down to the practical farmer of Canada, he took the common sheep of the country and gave them one cross with these pure-bred animals, feeding them until they were a year old, pasturing them and selling the carcasses. He did this for five years and then balanced accounts. Following is a summary of the accounts:

**The Half-Blood Southdown**—Cost six dollars for its keep, and this included all the items, the shepherd's care and the use of the mother, over and above what her fleece brought in for the year previous. Every item was reckoned in, so that this six dollars is the actual cost

of keeping that sheep until he was sold, which was at a little over a year old. It shore six pounds of wool, bringing $2.40. Its carcass weighed 147 pounds, live weight, and it sold at 6½ cents a pound, bringing $10.20, and giving a total profit of $6.60.

**The Half-Blood Shropshire** — Cost $7.00 to keep, shore nine pounds of wool, which sold at 38 cents a pound, bringing $3.40. It weighed 160 pounds, live weight, which sold at 6 cents a pound, making a net profit of $6.32.

**The Half-Blood Oxford**—Cost $7.40 to keep, shore eight pounds of wool, which sold at thirty-five cents per pound, bringing $2.80; weighed 177 pounds, which sold at six cents per pound, bringing $10.62, or a net profit of of $6.02.

**The Half-Blood Leicestershire** — Cost $8.10 to keep, shore eight pounds of wool, which sold at twenty-eight cents, bringing $2.24; weighed 198 pounds, which sold at five cents per pound, bringing $9.90, or a net profit of $4.68.

**The Half-Blood Merino**—Cost $5.50 to produce, shore seven pounds of wool, which sold at forty-two cents per pound, bringing $2.94; weighed 145 pounds, which sold at five cents a pound, bringing $7.25, giving a net profit of $4.04.

**The Common Grade.**—The native which was tried side by side with these, cost $5.00 to keep; it shore five pounds of wool, which sold at twenty-five cents per pound, bringing $1.25; weighed 150 pounds, which sold at five cents per pound, bringing $7.50, a net profit of $3.75.

**The Half-Blood Cotswold** — Cost $9 31 to produce, shore nine pounds of wool, which sold for twenty-eight cents per pound, bringing $2.52; it weighed 199 pounds, which was sold at five cents per pound, bringing $9.95, giving a net profit of $3.17

You see by these experiments that all these sheep paid a profit, and a handsome profit. You can draw your own conclusions regarding breeds. You will see it was not the heaviest shearing sheep that produced the most profit; so there are more things than the weight of the wool or the carcass to be taken into consideration in settling upon a sheep breed.

**Mutton Produced at a Profit.**—On this side of the line we can produce mutton at a profit. If you will figure out the cost of some of this mutton, as I have done, you will find that the lowest cost at which any of this mutton was produced was two and two-tenths cents per pound. If we can raise mutton here in Wisconsin at that price, and sell it at six cents per pound, which it has readily brought in Chicago the last year, we are making a good profit.

I, for one, would just as soon try to raise wheat, oats and barley for the straw, as to endeavor to raise sheep for the wool, under existing conditions.

**Profit In Early Lambs.**—I have some Oxford lambs that were dropped the first week in March, averaging, I think, about twenty-three or twenty-four days old, which weighed, just before I came here, from thirty-two to thirty-three and a half pounds each. The Shropshire lambs are a week younger and weigh from twenty to twenty-two pounds; the Southdowns about the same. As to the breeding qualities of these sheep, I will say we have thirty-eight ewes, and beside them are fifty-four lambs doing well and thriving nicely. I don't know what those lambs are worth now, but lambs that will weigh forty pounds the latter part of March and the first of April have sold readily in our part of the country, other years, to Milwaukee butchers, at from $3.50 to $5.50, and sometimes even a little more.

**Money in Raising Mutton.**—I be-

lieve it is possible for the farmers of Waukesha County to make some money out of raising mutton, but I believe that we must raise the standard of early maturity just the same as beef producers and pork producers raise it. I believe we cannot do as we used to do, keep a wether until it is three years old and make his fleece pay for his keep, because every year that we keep him he is going in debt to us, and when we sell him we have to make that up, and it doesn't leave much; but if we will feed from two to fourteen months there is a profit in a well-bred and well-fed lamb.

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**Discussion.**

MR. GORDON.—How can you make the American eat more mutton?

MR. MCKERROW.—Give him better mutton. There is a gentleman sitting in this room who told me he used to be a Merino man and he didn't like mutton. Last summer he got a taste of Down mutton, and he ordered the butcher to bring some more of that kind, and he said he couldn't; there wasn't enough in the country.

MR. FLEMING.—Do you think washing wool on sheep practicable?

MR. MCKERROW.—No, sir; I think they should be shorn unwashed.

MR. CLINTON.—Is it possible to pursue sheep husbandry as a specialty on land worth $100 an acre, and get a decent living, either for wool or mutton, or both?

MR. MCKERROW.—I think it is. These experiments I have just read show that there was a clear profit of $6.00 and over per head made on three of those half-bloods. Allowing six sheep to the cow, your profit at $6.00 per head would be $36.00, clear.

MR. HIRAM SMITH.—That was five years ago. At the price wool and mutton are selling for now, would it leave that margin?

MR. MCKERROW.—Good mutton is selling for more in our markets than it was six years ago.

MR. SMITH.—Could you get a living on an eighty-acre farm with sheep?

MR. MCKERROW.—I would be willing to try. I was speaking, however, of sheep raising with mixed husbandry.

QUESTION.—Do you let your sheep have access to salt at all times?

MR. MCKERROW.—Yes, always.

MR. AINSWORTH.—Which will cost the most and which will be worth the most, two Merino sheep that will shear twenty-five pounds of wool, and weigh one hundreds pounds apiece, or one coarse-wool sheep that weighs two hundred pounds and shears eight or ten?

MR. MCKERROW.—Those two hundred pounds coarse-wool sheep generally shear more than that amount of wool, to begin with. I can show you flocks that will average over twelve pounds of wool. I believe I can make as much money out of the large sheep that will raise two good mutton lambs that will give me ten dollars, and if your Merino will raise one I think she is doing pretty well.

# POULTRY ON THE FARM.

By REV. J. E. TURNER, Sussex, Wis.

**Progress in Fifty Years.**—The poultry interest of this country has scarcely kept pace with the progressive age in which we live; yet wonderful progress has been made in the breeding and management of poultry in the last fifty years. To-day thousands of chicks are hatched and reared by water and steam that never hear a mother's cluck. In an American poultry book, published in 1843, we find there were but few—not more than one dozen—distinct breeds of poultry known. Now in the American Standard of Excellence there are nearly 100 different distinct varieties of land and water fowls recognized. Now we have a great variety of incubators, brooders, artificial hatchers and mothers, that relieve biddies largely of weeks of monotonous sitting, brooding and rearing little chicks. One man in our own State (F. G. Underwood) runs a hatchery of 10,000-egg capacity, hatching thousands of chicks at one sitting, and rearing them for market.

**An Important Industry.**—The importance of poultry on the farm in this country must not be overlooked. Its production shows it to be one of the most important American farm industries. Flocks of fowls are reared on town lots in our cities and villages quite extensively—in some instances at the rate of 2,000 or more to the acre in a season. A few fowls are kept by the day laborer to supply his table with fresh eggs. Every farm, if containing only a few acres, has its flock of poultry, large or small.

**Keep Profitable Fowls.**—The farmer considers farm stock important only as it yields him a fair income on the capital invested. The horse must do good service on the farm or sell for a good price, or he is unprofitable. The cow must produce a fair amount of butter, or your dairy farmer will not have her. Sheep must produce a fair amount of good wool and raise good lambs or the sheep farmer will not have them. Hogs must fatten easily, on as little food as possible, or the pork-raiser will not feed them. So if poultry yields no eggs, meat or feathers, you don't want them on your farm, even if they do scratch their own living. Hence, poultry fanciers at our fairs are constantly asked: "Are these chickens good layers?"

**Poultry on a Large Scale.**—Poultry is important if one considers it as farm stock for profit. There are men who have made large sums of money producing poultry and eggs. James Rankins, Southeastern Massachusetts, runs a duck farm of a capacity of 10,000 ducks per annum, or 50,000 lbs. of ducks, which bring him from $10,000 to $15,000. He has said that a duck can be made to pay more than a cow. He has a large dairy farm, too.

A. C. Hawkins, Lancaster, Mass., has the largest poultry farm in the world. He keeps from 2,500 to 5,000 breeding hens, and raises from 10,000 to 12,000 chicks annually. His sales from eggs in 1885 amounted to $15,000, 90 per cent.

of which was profit. Then, he sells large numbers of fancy breeding poultry.

One man in this county tells how he made $1,276 out of poultry in 1885. He says his poultry paid him better than all other farm stock, all things considered.

At Lochsberryville, Pa., is a famous egg farm—Pennsylvania Incubating Co.—consisting of not more than an acre of land devoted to chickens. The buildings cost $4,000. The manager is a boy, who does all the work. The profits for a year from 625 hens were $1.00 per hen on eggs alone, after deducting those used for hatching purposes. The total profit on eggs and fowls was $1,680, on an investment of $4,000.

The poultry farmer is often sneered and laughed at, if he exhibits a little enthusiasm in his business, yet the poultry and eggs consumed in New York City alone, in 1884, was as follows: Dressed poultry, $25,000 worth; eggs, $10,000 worth; total, $35,000, and, with all these large figures, poultry is about the only product we do not send abroad, but market entirely at home. France and England send large quantities of eggs to this country, and receive a ready market for them. China furnished America in one year, 1,000,000 dozen of eggs. In 1882 we received 13,000,000 dozen eggs from foreign countries; still we were not satisfied. Poultry outranks any other single product raised or sold in this country; yet many think it is a small business—that only men of small intellect are fit to engage in it.

**Actual Profits.**—But as to actual profits: One says his profit was 300 per cent., and another 90 per cent., another 500 per cent. In a report of 10 farmers, keeping from 10 to 120 common fowls, 500 in all, a net profit is realized of $2 per head (1.98), making a profit after deducting 50 or 60 cents each for cost of fowls, of about 400 per cent. If 10 farmers can do that, why cannot many more do the same thing? Making large allowance for extra care and feed, there is still a profit of 100 per cent. to 300 per cent. in poultry and egg production on the farm, which shows conclusively that it is a profitable business, hence important to farmers. The fancy poultryman, like the fancy stockman, finds the business still more lucrative; reaps very large returns, often, for money invested.

**Money in Broilers.**—The broiler poultryman, too, like the sheep-raiser who raises early lambs for market, finds a very large profit in raising broilers that weigh from ¾ lb. 2½ lbs. each, to be sold from March 1st to June 10th. This class of poultry brought in the Chicago market in 1886, from March 3 to June 3, from $5 to $10 per dozen. The cost of a chick until 10 weeks old is estimated at 10 cents, or $10 per 100. At a low price—25 cents each—it yields a profit of 60 per cent. At Chicago prices, 40 to 80 cents each, the profit is 120 to 240 per cent., not such a poor profit after all. Farmers don't generally realize such figures out of their farm products.

**Requisites of Success.**—But we are told all poultry farmers do not make such a success with poultry generally, as has been made in the instances given. Do all farmers make the same success out of any particular farm product or stock? Certainly not. It depends largely on skill, talent and the interest taken in any farm product, as to what success will be achieved in it. If one don't like the poultry business, takes little interest in it, letting his poultry look out for themselves he must blame himself, not the poultry interest, if it is a failure.

**Important Points.**—In conclusion, let me say: 1. Put up suitable buildings for the business, not the same as you would for horses, cattle or sheep, but

such as meet the wants of poultry in summer or winter. 2. Get some one of the fine breeds of American poultry, so that if any are wanted for breeding purposes you can supply the demand at good prices. 3. Take care of them as you would other farm stock; they will bring you as good returns, some say better, than you get from most other stock on the farm.

A large amount of poultry raises itself, scratching its own living, roosting wherever it can find a little shelter. The farmer says it pays about as well as anything he raises on his farm. Surely there is a great saving in poultry on the farm for a little needed attention to its wants. Fowls will gather up and make profitable what would otherwise be wasted. The possibilities and importance of poultry on the farm, when rightly considered, are very great. It is high time that farmers gave this interest the attention that it justly deserves.

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# LIFE ON THE FARM.

By MRS. H. H. CHARLTON, Brodhead, Wis.

**How Opinions Differ.**—A farm may mean so much or so little, and life means such widely separated things to different individuals! Yet there is a common ground. To each mind it means life away from the city or the village; it means tilling the ground and living by the fruit's thereof. To one man the words open an interminable vista of long days of hard work, rising before sunrise and toiling after sunset; of work without leisure, of plain clothes, little cash and less pleasure.

To another they mean long days of communion with nature, as following the plow he notes each hint of the coming glory of the spring-time, the soft and varied hues of the trees with buds just swelling or bursting into blossoms, and the sudden changes of light and shadow—days as glorious as the radiant dawn with which they begin, as peaceful as the soft, gray twilight which brings them to a close, because health and strength attend his steps; days spent not amid the whir of machinery, nor amid jostling crowds, in the close and stifling atmosphere of shut-in city walls, but out under the broad expanse of heaven where the silence is broken by the song of birds, the drone of insects, by the rustling of leaves and the sound of loving voices; days of glorious liberty when he treads his own soil, cares for his own property and follows the dictates of his own will.

They mean long breaths of clear, pure air; long drinks at the cool, refreshing spring; they mean the woods redolent with the perfume of flowers and fruit, or the same woods in winter when through the interlacing net-work of boughs he catches glimpses of the blue heaven above, and the ringing song of his axe keeps time to the psalm on his lips; they mean comfortable clothing for the body, and rest for the soul, freedom from all the entanglements of politics and the tricks of trade, the freeman's true independance of thought and action.

Some such vision as this dimly out-

lined rises before the man who is truly called to the vocation of farmer. He sees clearly the work in it, but he does not fear it, for it is work under conditions he loves, and there can be no real living for the honest, healthy soul without work. He who seeks to live in city or country without work of some honorable sort belongs to the class of beggars or thieves.

Dislike for Country Life.—But all people do not see these things alike. In a group of ladies gathered at an afternoon tea, a young lady remarked:

"I heartily despise farms and farmers; everything indeed connected with farming."

Silence fell on the room, and a conscious blush rose to the face of every person present. At length some one said:

"I was brought-up on a farm, and I cherish the memory of my childhood's home. My parents stood high in community, and although my later days have been passed far from farm scenes, I do not know that I am to be the more respected for that."

The conversation following revealed the fact that all the older people present were born on the farm, and some of the younger ones. The young lady herself had spent her childhood on the farm, and the first wealth which flowed into her father's coffers had come from the rise in the value of his farm lands. She apologized for her ill-considered remark, but added: "I do not like country life." For this she was not to blame. She had been educated to think that life in any village or city was preferable; that the end of life on a farm was to get money enough to get away from it; and she showed only the weakness of ordinary human nature in despising that which she had made a stepping-stone to something she deemed better. Her mistake, and that of her parents, was the common one, that great possessions indicate success in life, whereas, a man's life is to be measured, like the life of the tree, by the growth it has made. We are all prone to forget that it should be our purpose not so much to obtain as to attain, for in the life beyond the grave our worldly possessions will avail us nothing, while any mental and moral worth we may have acquired will still be ours.

Educational Advantages.— But the city offers the best advantages for education! Perhaps so, if by education you mean a knowledge of books, and acquaintance with the achievements of art and science. But amid the multiplied trophies of the intelligence and handiwork of man, one is apt to lose sight of a higher intelligence in admiration of his own. The pursuits and occupations of the present hour absorb him, and become to him the highest good. The finger of omnipotence is constantly writing its lesson of infinite love and wisdom; but it writes it not on the brick walls and stony pavements of the city. You will find it written on the hill and stream, on the sunny meadow and in the sheltered groves; on the mountain top and in the forest glade; on field and wayside.

In the city library you may read the thoughts of great men, and be helped thereby; in the country you may read the thoughts of God, and with your ear close to nature's heart you may learn of infinite love.

Who Works in the Dirt?—"Don't talk to me of country life," says one, "I can't endure working in the dirt or walking in the mud. I like to live where there are side-walks and things are kept clean." Who works in the dirt? Not the farmer, for his work is amid living, growing things. He works not in the

dirt, but in the soil, that wonderful loom where nature weaves the sunshine and the dew into form and color. Call the grease and grime of the machine shop, the dust and fuzz of factories and stores dirt, if you will, but not the soil which gives back to man the smile of God in grass and flowers. The farmer would never set out a plant in the dirt, for it would only die, and his labor would be lost; but he breaks the surface of the ground, he stirs the soil, and to its warm and mellow depths entrusts the seed which shall return to him golden harvests.

A little country training would teach you to know soil from dirt, my friend. Would you see who live and move and revel in dirt, follow some of the filthy city side-walks out into the by-ways and alleys. The poorest farmer in the poorest hovel ever called a farm-house has kingly quarters compared to the inmates of the swarming tenement house, for all around him are light and air and sunshine. He knows the scent of wild flowers, and the color of a June sky. Scavengers may clean the city streets of their filth every night, but the springing turf upon which the farmer walks, wet with the evening dew, is fresh each morn and sparkling with a myriad of gems.

**The Most Comfort in the Country.**—Why is it when we speak of farm life that we always picture to ourselves the hard worked farmer, and when we speak of city life there arises before us a picture of gayety and ease, of handsome horses, elegant carriages, brilliant assemblies and costly raiment. We measure one by its narrowest limitations, the other by its widest possibilities. Yet life for the mass of mankind in country or city means constant labor, and the same diligence will insure more real comfort in the country than in the city, if we look below the surface of things. Measure both by the same standard, and let that standard be the best opportunity for physical and spiritual growth, and the balance is in favor of the farm.

**Moral Worth and Mental Culture.**—True, frequent association with others quickens the intellect and gives to one an ease of manner attained in no other way; but these are often superficial, and not always indications of moral worth or mental culture. I remember a vine in my father's garden which bore clusters of grapes of unusual size and beauty. Tempting, indeed, they were to the eye in their purple coloring, but oh, so sour to the taste, for in the longest season they never seemed able to gather in enough sunshine to perfect and sweeten them! Climbing on the same arbor was another vine whose clusters were straggling in appearance, and the grapes small by comparison; but I have plucked and eaten them with delight before the sun had given them scarce a tint of ruby color. The former ripened from the outside in, and took on all the bloom and beauty of perfection while still immature; the latter ripened from the inside outward, and had all the richness and sweetness of maturity while still appearing green. Need I say that the perfect character must ripen from the heart outward, and that otherwise all outside polish of manner is worthless.

**A Good Book of Etiquette.**—There is a book of etiquette which all may possess, the following out of whose precepts will give a charm to both mind and manner, of which the polished grace of city drawing-rooms is too often a mere imitation. It counsels as follows: "Be courteous; be kindly affectioned one toward another, in honor preferring one another. He that ruleth his spirit is

greater than he which taketh a city." The very acme of culture is self-control; the secret of all true politeness is forgetfulness of self, and grace of manner may flourish in the plainest farm-house as well as in the palace—aye, flourish more abundantly, because more likely to spring from the soil of sincerity. Churlish people may decide manners, but everywhere in life the old maxim holds good: "Politeness is to society what the cushion is to the rocking-chair. It adds nothing to its strength, but makes it more comfortable."

**A Mistaken Idea.**—But, says one, farm life is looked down upon. We are a young nation, and do not yet rightly measure the sources of our power nor properly estimate that sovereignty of the people which is our constant boast. Proud of our self government, asserting on every side our independence, we forget the first principle of that personal liberty for which our fathers fought, and cling to the traditions of the old world as if they were the legacy the pilgrim fathers fled to this country to preserve. The word farm means a piece of land set apart for a tenant, and when a lord owned the land and all who tilled the soil were his dependents, warring or keeping peace at his will, farming may have been an occupation below par; but in this land, where our fundamental doctrine is that all men are born free and equal, where the lord of the manor is himself the tiller of the soil, farming is lifted to the highest place among all occupations—to it, in effect, all other occupations bow. Art enobles it, science aids it, literature crowns it. How long shall we, forgetting all the dignity of the free-born citizen, forgetting all the rights of humanity for which the race has struggled from *Magna Charta* until now, go on talking about looking down upon farming.

**The Farms the Nation's Wealth.**—We boast of being a nation of homes. The little farms which dot the landscape are, indeed, the nation's wealth. Our agricultural interests far outweigh in money value the commerce of the country.

**What Thought Has Done.**—In every direction thought has been given to lessen the labor and increase the profit of the farmer's toil. Here is costly and complicated machinery which cannot be trusted to the ignoramus; the man must be intelligent who can properly use and care for it. Here are high-mettled thoroughbred horses which must be exercised, fed, watered and groomed with much more care and thought than the average parent gives to his children. Here are imported cattle which must be tenderly treated, housed warmly and fed properly. Time and attention has been given to devise the best plan for a barn, the best method of training a horse, the best way of preserving feed for winter use; to ascertain the proper temperature of drinking water for cattle in winter, and the best and cheapest ration of food. Last, but not least, the commonwealth is turning its attention to the farmers themselves. State universities have opened agricultural departments, as it has come to be recognized that farming is a learned profession. Indeed, so vital to the interests of the Republic is agriculture that it has, what no other single vocation can boast of, a special representative in the cabinet of the president of these United States. Can honor, father, go? Who will talk now of looking with contempt on farming? Did not our own State show its appreciation of the fact that its own prosperity went hand-in-hand with the prosperity of the farming com-

munity when it established these Farmers' Institutes? Formerly the school teacher "boarded round;" now the farm school passes round from county to county, answering questions, arousing thought, and diffusing needed information.

But the nation and State may do what it will—the dignity and beauty of the vocation will depend upon the character of those who follow it. Ignorance and carelessness will depress it; learning and faithfulness will uplift it.

**The Farmer's Home.**—As the farmer looks over his fertile lands, and ponders on the hard cash the growing crop will bring, let him remember that the farmer's home is as much an index of the man as that of the banker and lawyer. Let him take a little time from growing crops for money to make his home beautiful. A well-kept lawn, a thrifty garden, fruit ripening in the sun, flowers nodding to the breeze, vines clinging to the casement, are more truly the birth-right of the farmer than of his wealthy city neighbor. If the latter will spend his money for these things, shall not the farmer spend a little money to obtain them? In the farm home, too, should abound that love and sympathy that fills out the joy of childhood; that healthy literature which will tend to develop the noblest character, for the farm home is the recruiting station for all the high and noble vocations.

As agriculture is the sure foundation upon which the prosperity of our country must depend, so is agricultural life the key-stone of the arch of our civilization. Rough and unpolished it may now be, but it shall yet be fashioned into glorious beauty by the hands of a pure patriotism. Around it shall cluster not only the flowers of nature but all the bloom and beauty of varied culture, and farm life in this Republic shall challenge the admiration of the world.

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## THE COMING FARMER.

By REV. C. E. GORDON, Koshkonong, Wis.

**He is Coming**—From our agricultural schools. One can hardly measure yet the value that the agricultural college, the experiment station and the work-shops and forges at Madison, and elsewhere, are to be to this race of coming farmers. I remember going back to the old world a few years ago and finding a mighty change in the farming interests of England; finding the farmers who used to be pretty well off poor; finding that it is very difficult for the English or Scotch farmer to get a living, but finding, all about the country with which I was familiar, men who were doing well and getting rich; men who had studied in the English Experimental School and in the German schools. They are not only outstripping the old school Englishmen, who are getting poorer and poorer every day, but are making money and getting on.

**From the City**—Is coming the new school farmer. It is one of the most remarkable phenomena of this country that the best and most successful farmers—those who are doing most for agriculture and for themselves and other

farmers—are men who have retired from city life to take up farming, sometimes at an advanced age. The city men are making, some of them, the very best of farmers. I found last year out in the far West, in Idaho and Oregon, a great many retired merchants, tired of city life, who were most successful farmers.

**Average Farmer, Intellectually.**—From those three principal sources, then, are we to look for this new school farmer. He is to rise out of the present position in which the farmer is placed. What is the average farmer to-day, intellectually? He is intellectually a man who inherits the carelessness, the slovenliness, the shiftlessness of the Eastern farmer of the last forty years, and of the Southern planter, with the terrible wastefulness of the Western grain-grower. Those three elements have combined to make a representative man all over these United States who stands before us as a typical farmer. He is a wasteful man; he is a shiftless man and a most slovenly man. Unfortunate it is, but still it is a fact, and nothing but the new light of such institutions as this; nothing but the new light that is to be thrown upon this whole farming question by the great movement for the improving of the condition of the farmer, is to raise him out of the condition into which he is sinking, slowly and gradually—almost into the position of the European peasant. It is a very sad thing to ride through these fields of Wisconsin and find them taken up by men a little better than peasants. It is a terrible thing to see the hills and valleys of New England covered by men little better than peasants; but the change is coming. We live in a virile and vital age, and the time is upon us when there is new life; when men who are now but little better than grubbers of the land, are to rise into dignity, and tillers of the soil be farmers in the true sense. The farmer is coming; he is pretty nearly here.

**The Old School Farmer.**—It would be idle for me to say anything more about the old and new school. We know that these old school farmers are men who sneer at everything new; who do a little this way and a little that way, and nothing in any particular way; men who sell all they can from their farms and return nothing to them; men who sneer at those, who, like my friend Mr. Smith, are fools enough to grow corn without ears and call it ensilage. The old school man works against all legislation for improvement. Last week we asked the legislature to pass a bill fixing a standard for milk, asking for three per cent. only of fat, and many of the farmers said: "What are we going to do with our cows, are we going to go home and kill them?" They thought three per cent. was too rich.

**What Will the New Man Be?**—What is the new man to be? He is to be a combination of the theoretical and the practical farmer. We can look back now and see the result of practical farming with next to no theoretical knowledge. We see the folly and the mistake and the mischief of this constant practice, practice, practice without the theory behind it. No, farming is a theoretical thing first, and then a practical thing, and the coming farmer shall be grounded in the meaning of the soil, in the word that the crops say to him about the laws of chemistry; in the meaning of the animal that he is to tend, in its functions, its peculiarities, in its wonderful powers of development. A man must be educated in the next twenty-five years not by the word of his father before him, but from the school of the farm, from the education of the university and of the training school and of

the experimental farm, and all those agencies that go to make a man an intelligent man in his own profession. That is the education necessary to compete with the combinations that are to be against the farmers of the next fifty years. The old scratching of the ground might as well be done with the old Egyptian plow, and a woman harnessed alongside of the mules, as to be done in the way we are doing it now on a large number of farms. First, there must be the cultivation of the brain, then the cultivation of the hand, and then we shall have the farmer of the future.

**Special-Purpose Farming.**—Forty years ago the general store was all that was necessary. It kept a little molasses, a few groceries, a few boots and shoes and rubbers, and this, that and the other; but now we have a special store for the shoes, and a special store for the sugar and the tea and so on, the special drug store, and every other kind, and we are better served and hundreds are getting a living where one only used to get a living. So it must be with farming. The special-purpose has taken the place of the general-purpose store, and wherever you find a thrifty neighborhood in an agricultural community in the western part of this country you find following upon the heels of a general-purpose store, instantly a special-purpose store. So in farming, we must change from general-purpose to the special-purpose. The general-purpose farmer must give way to the special-purpose man—a man with the most earnest purpose to be a specialist in the position in which he is placed, A man cannot breed a few colts and a few sheep, and a little grain and a little milk successfully. It cannot be done any more than a man can do it in selling merchandise.

**Land—Tools—Crops.**—In Wisconsin we have offered to us, I think, about four things for the coming farmer. We have special-purpose land. A man who knows what he is doing will find land adapted to his work. We need special-purpose tools, that is, special-purpose machinery and buildings. They will be absolutely necessary to the successful farmer. We need special-purpose crops. I do not believe that a man who is dairying or a man who is raising beef has a right to think of raising anything on his farm that does not go through the stomach of an animal to come out as butter, or as a well-bred calf. Let us leave it to Siberia, the greatest wheat-growing country that the world has seen, to grow wheat, and let the dairyman raise such stuff as shall go through his cow and come out in butter.

**Special-Purpose Stock.**—Then, he needs special-purpose stock; that is absolutely necessary to the successful man of the future. I have read a great deal this last winter, and have been to many meetings of farmers, and have heard resolutions passed on the election of the president, and complaining of the railroads and this, that and the other, but I have yet to hear of a single resolution passed in any farmers' convention sending forever to the butcher's block, and to oblivion, the scrub bull. I tell you that the scrub bull in Wisconsin is a deadlier loss to the farmers than all the schemes of the railroads, than all the intrigues of politics, than all the disturbances in the social condition in the State in which you live. I tell you he is a deadly enemy, social and political. So I say, the coming farmer would no more think of having a scrub bull on his farm than he would think of introducing a scrub bull into his church.

**Fruits for the City.**—The special-purpose in Wisconsin, I think, will be, for the present, fruits for the city. We heard to-day that Wisconsin is admir-

ably adapted for the growth of the delicate and delicious fruits that bring such tempting prices in the city. Then, it is one of the special duties of Wisconsin farmers and horticulturists to raise those fruits in their most perfect condition, and to make a specialty of doing it and marketing them in the best market.

**Horses for City Use.**—It is also one of the special businesses in Wisconsin to raise horses for city use. I do not believe it is the special business of the Wisconsin farmer to raise trotting horses for the country fairs. I do not believe it is possible for the average Wisconsin farmer to raise a decent horse for road purposes from the class of mares he uses upon the farm; yet I think that the special-purpose farmer can raise horses for city use—big draft horses from fancy draft horses; the best road horses from the best road stock. But the average farmer has no right to touch horse-breeding except he does it in a thorough and systematic special way, and horses can be raised in Wisconsin just as cheaply as anywhere in the world. We have a little shorter fall on the blue-grass and a little longer winter, but we have the best climate, the best land and the best water in the world to raise horses, and Kentucky men have told me that if we only chose to get the stock here, we could raise better horses than they can in Kentucky—horses with better qualities, sounder and better constitutions.

**Hogs for Fine Tastes.** — Then, of course, a most important purpose is the raising of hogs for fine tastes. I do not believe Wisconsin is destined to raise hogs for the lard pail; I think that belongs to the great southern belt. But to raise the fine hog for the fine taste, for a Deerfoot Farm Sausage, for the clean cut handsome ham, for the nice tasting breakfast bacon, for those things that bring a high price, it seems to me Wisconsin is admirably adapted for that purpose as a specialty.

**Dairying for Profit.**—Then, at last, we come to the great specialty of all—Wisconsin dairying. We are destined in Wisconsin to be the typical dairy State, if we only mind what we are doing; if we only guard carefully, by law and by injunction, our dairy interest; if we shut the door forever against Chicago fraudulent butter and Chicago fraudulent cheese; if we shut forever and keep always under foot the fraudulent cheese factories of our own State. If we can put our foot on these things that have, during the last twelve months, lost to Wisconsin $900,000 from the fall in the price of cheese alone, we will rise to be the leading dairy State of the world. We have every facility for it. We will have to protect ourselves against fraud, we will have to work earnestly with the best methods to produce fancy cream, and fancy cheese, and standard cheese and the best butter, to bring Wisconsin where she really ought to be to-day, and can be in a short time—the leading dairy State of the United States, and that means the leading dairy corner of this hemisphere.

**The Farmer's Wife.**—But the coming farmer will probably marry. He ought to marry pretty early, I think, if he can find anybody who will join him. I cannot say a word about the coming farmer unless I say a word about the farmer's wife. Familiar, as I am, with the squalor and misery of the city, the most pathetic misery of all, it seems to me, is often found in the life of the average farmer's wife. She sees her husband buy every tool to lighten his own labors; she sees him hire the help that is needed to aid him on the farm, and she is a slave of the oldest fashion. Her tools are the tools that probably were used at the time of the

settlement of Canaan. Sometimes I go into farmers' houses and I see tools in the kitchen that, it seems to me, must date back to the time of Abraham; nothing new or convenient, while the farmer has his modern binder and reaper, his tearer and scratcher, and everything to lighten the labor of the land, and nothing to lighten the labor of the house. But the coming farmer is to provide his wife with every modern convenience to make her life just as rich and large and full and happy as his. She is to have co-operative washing, and save that terrible horror of Monday morning in cold weather, on the farm, where she has not a nice laundry and soapstone tubs, and hot and cold water. This is only a sample of what the rest will be. The farmer's wife is to be as good as he in respect to this matter of convenience.

**The Balance Wheel.**--So shall we turn once again to the country for the statesman, the soldier, the philosopher, even as we did in the early days of the Republic, before the fields of the East had been worn out by carelessness, before the plantations of the South had been ruined by shiftlessness, and before the magnetic attractions of cities had drawn the best blood of the farms. We shall again turn to the country to find there an educated, conservative, loyal constituency, which will be the balance wheel of the country.

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# THE NEEDS OF OUR PUBLIC SCHOOLS.

**By H. C. THOM, Madison, Wis.**

**At the Bottom of True Progress.**—Down at the bottom of all true progress in this great country of ours is the little common school. Seventy-five per cent. of our men and women go only to these schools, and it should be for your interest as citizens of Wisconsin that they should be lifted by your moral and educational sentiment to as high a standard as possible. The business men must have children who come from these schools, the professional arenas are filled with them. I tell you, my friends, the professions demand men who have girth of lungs and are broad shouldered, to stand the vicissitudes of life which are found in their ranks.

**Trouble With Country Schools.**—In my short experience with the country and with the city schools, my observation has taught me this: In the large cities we have spacious rooms, well furnished with every appliance to teach a child with, apparatus of every kind to hurry along his progress, while away out on the hillside, in the country, there is a little house that cost $600 (perhaps that is too high), furnished only with knife-eaten desks and an old dictionary with half the leaves torn out of it. We have in the country schools a set of teachers who come in in the fall and stay until spring. A new set come in in spring, and stay until fall, and then we have another set, and so it goes all the time. We have a teacher spending one-third of his time in trying to find out how little the teacher just before him knew, and the pupils are not long

in following suit. What is the trouble that our schools are not as good as they should be? Is it the district board? This district board has been "cussed" and discussed, and every Monday in July they turn out and raise $200 to pay the teacher with and pay the running expenses of the entire district, and so the board is handicapped all the way through.

Let us turn to the superintendent. What kind of a man is he? Has he that invention which is so necessary to a good guide, namely, a back-bone? Has he courage enough, when he goes around and finds that a teacher is a poor one, and that teacher a lady, to stand up and say: "Here, my dear young friend, you can wash dishes a good deal better than you can teach school, and you had better do it?" The superintendent must have moral courage to do his duty by the county that has put him in office. Is the trouble here? Perhaps it is the teacher; perhaps it is the sentiment in the district; but let us see.

We pay a school-teacher from sixteen to twenty-five dollars a month. Does that hold out any inducement to a teacher to go into a proper training school and there fit himself so that when he comes back he may get the munificent sum of sixteen dollars a month? It will not do; we are not holding out the inducement. If you get a good teacher you have to pay money for him. You know very well that if you get a piece of five-dollar cloth, that it is five-dollar cloth, and if you get a twenty-dollar teacher, he is a twenty-dollar teacher, every time. We must pay more money if we are to get good service. We, out in the district, demand too much for sixteen or twenty dollars. We want the teacher to be as wise as Solomon, as patient as Job, and have the executive ability of Grant, all for twenty dollars a month. He must answer every imaginable question, and always stand glass side up for twenty dollars, and the man and the woman in the country, as a rule, who finds the most fault with the teacher because he can't manage twenty or thirty or fifty children is the man or woman who cannot run work well at home.

A Word about Text-Books.—Another thing: If we go into the city we find a text-book here and another one above it and still another above that in a graduated series; but if we go into the county school we find as many text-books of as many colors as that coat we read about. Wisconsin is a wealthy State—a State of wealthy farmers—and many of them have tenants on their farms, and no matter whether they raise a large crop of barley or wheat, they are generally successful in raising a good crop of children. Whenever a tenant changes farms he has to provide text-books for all the way from eleven to eighteen children, and it is quite a burden. We might make a change that would not cost a dollar more than our present system.

The Character of Teachers.—In regard to the character of teachers we employ, if we set our standard a little higher, and raise our wages a little, we might be enabled to get a better line of service. If you hire a man on your farm, about the first questions you ask him are: "Dan, can you stack grain? Do you know how to milk? Can you save hay in the field? Can you break a colt?" You ask him all these questions, and at last you ask him how much he wants a month.

If your boy climbs a tree on Sunday afternoon and falls down and breaks his leg, you will drive twenty miles to Waukesha, or elsewhere, in order to get a doctor who you know is a skilful man at

the business; but you will take that boy of yours, whom you love so well, who has a character as tractable as clay, that can be molded in any form, send him away to the school-house and put him into the hands of a teacher who is to mold and build his future; and you never know a thing about where the boy is going, or under what kind of teaching he lives. If you have a blooded colt, you will take him out-of-doors three times a day, exercise and water him, drive him and do all those little things that make a fancy, "toppy" goer; but if you have a boy you will say: "John, take your books and go to school and get back just as soon after four o'clock as you can." And you don't know anything about the school, only what the children say, and that is the most unreliable thing in the world.

We owe our boys and our girls more than this. If you write letters just as deep as the knife can send them into a piece of marble, the hand of time will efface them; but if you place a boy under the hands of an unskilful master, he will grow under those hands, and there is nothing that will show the evils of misdirected effort so quickly as the character of a boy, and there is nothing, on the other hand, that will grow and develop and bear fruit as quickly as a boy's mind under a skilful hand. You owe it to your boy, it is a duty that should be sacred to every heart here, to see that he is properly educated.

The Kind of Teachers to Hire.—What kind of teachers shall we hire? First of all, they shall be men, they shall be women, they shall be living exemplars of what they teach. There was a young lady in our district who came to me a short time ago and said: "What kind of a school do you want taught?" I replied: "I would have that boy of mine taught the little courtesies of life. I would rather have these deeply instilled into his mind than that he should know all the rules of arithmetic and all the lives of the governors of New York." I will tell you how that came out. In about three weeks that boy came home. We sat down to dinner, and I cut off a piece of meat and put it on his plate. He turned and looked at me and said: "Papa, I don't like fat." I said: "Son, if there is anything on your plate you don't like, leave it there and say nothing." His sister sat next to him, and he looked at her, handed her the plate, saying: "Ladies first." That boy learned courtesy with a vengeance.

A School for Every Nationality.—Since we have a common school, let us make it in every sense a common school except in name. It should be a school that shall open its doors to evey nationality. I want my boy to sit by the side of an Irish boy, and I want him to sit by the side of a German boy and a Norwegian boy; I want them to grow up from the same bench together; I want them to understand that we have a government in which there is no platform over men's heads to keep merit down and demerit up; that we are living under a constitution which recognizes merit in its truest sense; that good will rise to the top and that bad will sink to the bottom. Men in this country do not meet you with the question, as they do in England—"who is your grandfather?"—but they look you squarely in the the face and say: "Who are you, and what are you good for?" I would no more wish to have my boy separate himself from the German or the Irish boy than I would that there should be separate seats for the Methodist and the Presbyterian and the Catholic boys; but I would have them all sit upon one common seat, and as they grow up in knowl-

edge and have a judgment of their own, they would recognize that there are good men and true men in every denomination. The worst problem that we have to meet to-day, is the fact that we have sectional feeling all over our broad land and under the same constitution. I would see the boys grow up together, and I would have them develop into good men and good women who will make good citizens, and while they are there together I would have them study that we have a government repregenting the underlying principles of good citizenship; I would have them learn patriotism in the truest sense of the word; I would have them understand that we are living in a country that is a little better than any other country on God's green earth, and that there floats over us a flag which is the best flag that floats to the wind.

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# DOMESTIC ECONOMY.

By MRS. J. A. CLARK, Waterloo, Wis.

**Fruit for Breakfast.**—I will confess that I dread breakfast most of any meal during the day. It is not quite so hard to prepare an appetizing meal for a man who has been up and about for an hour or two doing his chores, and brings his appetite with him when he comes in, but for the brain-workers it is more difficult. For such I would provide, first, fruit of some kind. In melon season, nothing is better than musk-melons. If these are properly started in the hot-bed, the season is a long one, and we can have them each morning for many weeks. In fall, winter or spring, a baked sweet apple with plenty of cream on it is delicious.

**Cream—Bacon—Eggs.**—Cream, unless our farmer happens to sell his milk to the cheese factory, is one of the things he should be lavish of, and is one of the greatest of edible luxuries. After this, bacon and fried eggs are another of the farmer's specialties. These, with buckwheat cakes and maple syrup, coffee and plenty of cream, make a good farmer's breakfast, and nearly all raised on your own farm.

**Maple Syrup.**—The only extravagance about this meal is the maple syrup. I was fortunate enough last year to get pure Vermont sugar at ten cents a pound. If you read, as I suppose you all do, the reports of the Experiment Station, you will see that certain of the foods excel in certain elements, and are valuable accordingly, namely, some in albuminoids, others in carbohydrates, protein, etc. You doubtless understand all this, or if you do not, Prof. Henry can easily make it clear to you.

Chemists have demonstrated, that in filling certain of the requirements of the human body, a pound of sugar is equal to three pounds of beef; so you see that sugar is about the cheapest food you can get. Honey, if you have it, makes a good substitute for maple syrup at this meal.

**Broil Your Beef-Steak.**—Beef-steak may be substituted for bacon, only do

not fry your beef. There are kind hearted people who will not eat flesh, because the animal has been killed. I do not go as far as that, but when a steer has been killed and his flesh fried in the pan, there has been an additional murder committed, besides the original killing of the beef. I *do* draw the line at that crime. Broil your steak, on a gridiron or wire toaster, over the coals. Cook it rare, serve on a hot platter with salt, pepper and butter on it, and you have your steak as it should be.

**Fried Potatoes—Toast—Cheese.**—Fried potatoes and nicely browned toast go well with beef-steak, and milk toast, and scrambled eggs are a temptation to a flagging appetite. Dutch or Cottage cheese, eaten with cream, is a favorite dish at our house.

**Soups.**—In killing a beef you have to take the good and the poor, and in no way can you utilize the poor beef so well as in soups. The French, our greatest cooks, excel in this respect. A recent article in the New York Tribune on this subject closes as follows:

"It is so good and cheap, it is a part of the daily food of rich and poor. A soup supplies the place of the stimulants, to which too many working men in this country are driven, by food which is so greasy and poorly prepared that it is of little or no food value, and fails to supply the waste of tissues caused by daily work. The good table of a good housewife does more for temperance than a thousand eloquent homilies by a thousand wise men."

**Vegetables.**—I would recommend the using of a greater variety of vegetables. Try one or two new kinds every year. Not every farmer raises "Brussels' Sprouts," but I think all should. They are a kind of a glorified cabbage, without the objectionable features of that vegetable.

**Puddings and Pies—Cake.**—Puddings and pies are a good thing to have, especially puddings, and salads are a great addition to any table. Cake is a vanity, and the only kinds called for in a farmer's family are a plain cake with ice-cream, and a wedding cake when the girl gets married.

**An Abundance of Good Things.**—The ordinary every-day farmer has at his command a continued abundance of good things in the eating line. At our house, just now, we are picking the first fruits of our hot-bed, in the shape of deliciously tender radishes. Next week we will have lettuce, and shortly spinach and beet greens. It is astonishing with what little trouble and expense these things are grown. A half-day's work of our man, at a time when his work is of no account, prepares the hot-bed. The only other expense, except the original charge for sash and box, is the seed and an occasional broken glass.

**Ice.**—So with our ice. It is the one crop in this country that never fails, and it is harvested when there is nothing else doing. At an annual expense that is not noticeable, it gives us an enjoyment that we otherwise would not have for half a year. I will acknowledge one drawback to these luxuries. Before we had ice, once or twice in the course of the season we would go to the village restaurant and buy a dish of ice-cream. I confess that this, under these circumstances, tasted much more delicious to us than much better ice-cream does now, when taken more commonly at home.

**Celery.**—In those days, before we had celery all winter long, we used to go to the garden of an old German friend of ours who was so fortunate as to have lettuce fit to eat about the first of June, and none that I ever raised equaled that, flavored as it was, with a six months' abstinence from a fresh vegetable diet. Nature gives its compensation,

though I hardly think it pays to go without six months for the sake of acquiring an additional zest to our appetites.

**Woman's Special Province.**—To provide this food and have the proper arrangement of our domestic affairs is woman's special province. Her education should tend to this. Her business in life is to make some home happy, and to do this, she must have a thorough understanding of the needs and requirements of domestic management.

**A Farmer's Wife's Education.**—I believe in the higest education for woman. There is no danger of any one knowing too much or being too accomplished, but this higher education, especially for a farmer's wife and daughter, must be built on a solid foundation of *practical every-day household knowledge.* It can detract nothing from the attraction of a farmer's house, if his daughters are good musicians. If they know Latin and Greek, it will do no harm, but rather be a distinction than otherwise in their later days. But, in addition to this, if they are to be farmer's wives, they must know how to take care of a slaughtered hog. They must understand souse, and comprehend cheese, and have a realizing sense of the merits of spare-ribs and pickled pigs' feet, and all the mystery of sausage. In the education of our daughters we make a great mistake if we neglect these things.

**Mothers Favor Their Daughters.**—There is a tendency on the part of some mothers to favor their daughters at their own expense. They will wash the dishes rather than have these young ladies soil their hands; they will take care of the milk and make the butter while the girls sit in the parlor and practice on the piano. This is a wrong to both of these parties—to the mother, in that she sacrifices herself to one who is under obligation to her, and to the child, because by thus taking her duties from her, you make her selfish, and render the work that must eventually—if she marries and has a family—come doubly hard. How will her children fare without a mother competent to either help or teach them? is the question that should be asked. I do not think there is much of this, but yet every one must have noticed instances.

**Conveniences.**—Mr. Morrison, when he wrote me in regard to my subject, said: "Even the simple matter of making a delicious cup of coffee is a sealed secret to the great majority of ladies. It seems to me," he says, "that there is about as much stupidity in this direction as can be found in any of the callings of life."

I gather from these remarks of our excellent Superintendent, that in the course of his perigrinations through the State this winter with his institutes, he has put up at the country hotels rather than with the farmers, and I am sure that there he has made a mistake. I can well understand his complaint, if he has tried the hotels; but let me recommend to him another year the hospitality of the farmers. I think he would find that he had improved on his quarters, and that the farmers and farmers' wives would maintain the reputation, that I think they have, of being bountiful and tasteful providers to the best of their ability. I say here, to the best of their ability, and I say it in reference to the farmers' wives. For it is a fact that, in the march of improvement, the great advance in machinery, inventions and in all conveniences, comfort and their means of doing things have *not* advanced as have other kinds of work on the farm. I regret that this is so, for I believe that the *truest* domestic economy consists in furnishing con-

veniences for the wife and house-keeper, so that she may economize *her own strength.*

**Arrangement of the House.**—First, the house should be so arranged that she can perform her various duties without too many useless steps. In many houses the cellar is under the "upright," and the kitchen in the farther end of the "L." The well is apt to be on one side of the house, the cistern pump on the other, and the wood-pile far away. Properly, the inside cellar stairs should lead directly from the kitchen—and there should be outside stairs for the carrying in of vegetables in the fall, and for milk in the summer, if the milk is kept at home.

**The Sink.**—Every farmer's kitchen should be furnished with a sink, into which both hard and soft water should be brought by pumps. It is not always convenient to have the well water thus brought, but there is no reason why the cistern water should not be. This sink should connect with a drain for the carrying away of waste-water. If water must be brought into the house in pails, it surely is too much to ask that it be carried out in the same manner and thrown on the ground to make a spot offensive to sight and smell, and a breeding place for flies. At one end of the sink, a long, broad shelf makes a good place to put dishes as they are wiped, and under this should be drawers for dish-wipers and kitchen aprons, and a cupboard for tea-pot and coffee-pot, tea canister and coffee-mill, and under the sink a place for pots and kettles.

**The Wood-Box.**—A wood-box built in the partition, between kitchen and wood-shed, opening directly behind the cook stove on the kitchen side, and so arranged that it can be filled from the wood-shed, is a great convenience and saves many steps and much dirt.

**The Cooking Room.**—A small room on one side of the kitchen to be used as a cooking room is another labor-saver. In this a large flour chest, with partitions, can hold flour, corn meal and rye meal. If of the right height, it makes a good place to rest the molding board upon, while in use. Over it are rows of shelves for spices of all kinds, boxes of raisins and currants, sago and rice and other groceries; near by the sugar bucket, molasses jug, lard jar, baking tins, pie plates—in fact, all and everything that one needs to use in the making of bread, pies and cake, should be in this one room, where it could be reached with scarcely a step.

**Cupboard for Dishes.**—The cupboard for dishes, built between dining-room and kitchen, with door in either room, will be found a great convenience. Underneath the cupboard, drawers should be placed for storing table-cloths, napkins and extra knives, forks and spoons.

**The Sewing Room.**—A most desirable room is one which could be used in summer for a sewing room, large enough to contain sewing machine, cutting-table, work-basket, lap-board, a low, easy rocker and an old-fashioned lounge, where the tired mother can take her afternoon nap. If she has such a place, where all her making and mending can be reached at a moment's notice, the time for the nap is much more easily found than it otherwise would be.

**Bed-Rooms.**—Bed-rooms on the lower floor are a necessity in a house where children are reared. My summer bed-room has an outside door, which I find a convenience and a luxury.

**The Living Room.**—The room for rest and recreation should be on the south side of the house, into which the sun can shine all through the long winter. It should have a coal stove, or

a good wood base burner, and a fire night and day, a little less than eight months of the year. This room should be made as pleasant as one's means will allow. There is no need for costly furniture, but let it be comfortable in every way—light, warm, a place where the children can play on the floor, and the older people rest in easy rocking chairs, with pictures, if you can afford them; books, by all means; playthings for the smaller children, games for the older ones — a room hard to keep in order, perhaps, but one that the children will remember with pleasant recollections all their lives through.

**Tack-Puller — Carpet Sweeper.**— There are many things for lightening the labor of women, which many of you may have, and others never have heard of. There are no agents to go around and sell them, probably, because their cost is so small that they could not live on the commission they would get. many a woman this coming spring will get down on the floor and pull tacks from the carpet with a screw-driver or a butcher-knife, when there is a little tool made for this purpose, costing twenty-five cents, called "Little Jack, the Giant Tack Puller," which not only pulls the tacks from the floor, but from the carpet. Any small child can use it, and it saves its cost in tacks every two years. A carpet-stretcher, costing seventy-five cents, brings the carpet easily to its place, and saves a great many times its cost in lame arms and aching shoulders, every year. A carpet-sweeper is as much ahead of the ordinary broom, as the ordinary broom is ahead of the hemlock ones I remember seeing one of our neighbors use when I was a child.

**The Sewing Machine.**—Every one has a sewing machine, but I doubt if any of us ever have our sewing as well done as our mothers had before sewing machines were invented.

**The Washing Machine — Ironing.** — If any one has a washing machine worth the house room it occupies I wish she would let me know of it. A folding ironing board is very well for children's clothes, skirts, shirts, etc., but I had a little table made, two feet wide, four feet long, set on castors, which is easily moved, and is much better for ironing sheets and long table cloths. The uses to which this little table is put are innumerable, and it is astonishing how much the burdens of life are saved by placing many things on little wheels. Few women are so constituted as to be able to lift much, but their ability to *push* things is something wonderful.

**Truck for Moving Stoves.**— Speaking of wheels reminds me to say, that with five pieces of 2x4, thirty inches long, and a set of castors costing a dollar, we have a frame upon which we put our coal stove, when not in use, and a woman or child can push it from one end of the house to the wood-shed, and by means of this device the taking down and setting up of the coal stove becomes an easy matter. Most *men can* lift a good deal, but I notice that few of them seem to enjoy carrying around a coal stove.

**Cleaning Vegetables.**—Every one has an apple parer, and I have tried potato parers but alway return to my little knife. If potatoes are well cleaned with a brush, the paring is an easy matter. The various brushes now made for cleaning vegetables are good things to have, and an ordinary scrub-brush for wood-work does the work much better than can be done with a cloth, and is not nearly as hard on hands and arms.

**Folding Dish-Rack.**—A folding dish-rack, costing twenty-five cents, is for sale at crockery stores. By using

this only half the towels are needed that are required when the dishes are drained in the ordinary manner. A wire dish-cloth for kettles and tins is a necessity in every kitchen.

**The Lightning Chopper.**—For the making of mince pies, plum, and hasty puddings, and various other things, many people use the ordinary wooden bowl and a chopping knife; but there is a machine called the "Lightning Chopper," which makes play of these otherwise laborious tasks. The knife is carried up and down, in a revolving pail, by means of a crank, and is so easily worked that a small child can use it. It costs about five dollars and is, apparently, indestructible. Mine, after the use of many years, seems as good as new, and has been worth fully the cost of it each year that I have had it. It does not make quite as much noise as a threshing machine, but enough to delight the children, and to let the farmer know, if he is within easy distance, when he may expect something *fine* for dinner. A lemon squeezer and a potato masher are also convenient articles, and cost but little money.

**Necessary Tools.**—Many things about the house are often destroyed for want of a skilfully-driven nail, or a well-turned screw. It is said that a woman cannot drive a nail, but how can you expect her to if she has only a flat-iron to drive it with? I well remember the first shelf I put up. My tools were a wood-saw, a butcher-knife, and a disabled monkey-wrench. I know more now than I did then, and have a saw, hammer, screw-driver, chisel, two gimlets, a box of screws of all sizes, nails of all lengths, tacks, linen twine, and many other handy and useful things, in a cupboard in my kitchen. I find these a great convenience, as do also the men folks, judging from the number of times they come to the house to ask if they can borrow some of these things, taking care to explain that theirs are laid away under the snow, or in some other equally inaccessible place. They are always careful to return them, and recognize them as belonging entirely to me, and you know it is a comfort to a woman to be absolute owner of something, if it is only a saw or a hammer.

**Reserve Supplies.**—There are many other branches of domestic economy which I have hardly time to touch upon. The importance of keeping a good supply of reserves, can not be too strongly urged. My mother used to say that sheets and table-cloths should never be worn out, but when about half worn, new ones should be purchased and the old ones laid away for extra occasions. Unexpected and long-continued company often cause us to need large supplies of table linen and, when sickness comes, there can hardly be too much bedding.

**Plan Systematically.** — Eternal vigilance must be the price of good house-keeping, but eternal drudgery need not be. If we will systematically plan our work; if we will intelligently plan our houses, life will be much easier for many of us. I know many women complain that they cannot rebuild their houses, and cannot procure the conveniences they desire; but I believe that if a woman *knows* what she wants, and will make her husband *know* that *she knows*, in nine cases out of ten she will get it. It is always well to submit to the inevitable with grace and philosophy; but we don't want to get into the habit of accepting as inevitable things which might be changed by a little persistance on our part.

**Too Much Work.**—It is said of America, by a recent visitor, that here every one works, and it is also said that

work without ceasing is making this country one of the most prosperous, but one of the most unbeautiful countries imaginable. No one here has time to be idle; yet it is only in idleness and leisure that the beautiful can be developed, either in the brain or by the hand. We, the farmers' wives, as a class, are true to our work. We will not only do our duty ourselves but we will bring up our daughters to take our places in the next generation. Nature has done her share in giving us a beautiful State. In no other country does the sun shine on a lovelier landscape. Can we then be blamed if we wish to make our homes beautiful and fit for the situation in which we find them placed? To do this we should have leisure, and if by defects in our domestic arrangements we are compelled to spend the time in *useless* labor which is needed for giving us a higher education and a greater beauty in our surroundings, it is a crime on the part of those whose duty it is to provide for us and for whom we perform our unfailing share.

Buy Your Wife Labor-Savers.—Let the farmer, when he congratulates himself that by his wind-mill he has saved himself the labor of pumping water for his stock; that by his binder, he now does not have to sweat in the harvest field; that by his hay-loader and horse-fork, and mower, and self-dumping rake, he has freed the hay field of its terrors,—let him, I say, when he comtemplates all this labor-saving machinery, use equal energy and wisdom in providing smaller labor-saving implements for his wife, and I will promise, on her part, that she will do her duty, not only in providing for the wants of the house, but also in making a farmer's home what it should be: a place of refreshment, a home where culture and comfort dwell, where elegance and beauty are cultivated, a fit dwelling for that best specimen of humanity, the Wisconsin farmer.

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# THE FARMER AS A CITIZEN.

By W. D. HOARD, Governor of Wisconsin.

About Calves.—Mr. Thom has spoken about calves. From my earliest infancy down to to-day (I am not paying much attention to calves now) I was brought up along with bovine babies. I have had a deep interest in the little animal called the calf, and, as a consequence, at an early age I made something of a study of the animal. Calves are very much alike, whether they come from one breed or another. As a rule, those who have had experience in dealing with them discover that a thoroughbred calf is the most intelligent. There is a long line of heredity in its behalf but the most provoking thing on this green earth at times is a calf. He will stand and regard you with a look of mild and innocent baby-like wonder, and a stupidity that is unfathomable.

The Deacon and the Calf.—I am reminded of an incident in the history of good old deacon Coolidge, a neighbor of mine in New York, and I tell you this story now for the purpose of explaining somewhat, it may be, certain

derelictions or deviations from the strict orthodox pathway that men may be pardoned for indulging in who have the handling of calves. Deacon Coolidge was one of the best men I ever knew, with a heart overflowing with love to his fellow-man, to his Maker, and to all things that his Maker had made. He was a thrifty farmer, and his wife was like him. Aunty Coolidge was one of the best women who ever lived. Sunday morning came. The old man had just hitched up the old mare and started for church, three miles distant. He had driven into the road and turned back to shut the gate, when the old lady said: "Pa, I declare for it, that calf hasn't been fed, and the milk is in the brass kettle on the stove, all warm for him." "Well," the old man replied, "well, well; this is a pretty time to think of feeding the calf, I declare, with my best clothes on. Maria," he said, "what are you thinking of, not to speak of it before?" "Well, pa, you know that we claim to be Christians, and if we should go off to church all day long and leave that poor calf without anything to eat, we couldn't pray enough nor sing enough to make God forgive us for such an act." "Well," said the deacon, "I guess you are right." So he started back, took the brass kettle from the stove, and gathering up his Sunday meeting coat as snugly as possible, he walked along with the milk to the calf, who was impatient and eager and hungry, with expectancy standing right out in his little eyes. The old deacon says: "Bossy, bossy, come along, come up here, come along." And so he inserted his finger, no, two fingers, for he was a shrewd old deacon and knew better than to try to feed that calf with one finger. He led that calf down into the pail, and it began to taste good, and the calf began to get very much engaged in it, and his tail began to show just how he felt. He plunged his nose down below the drinking point, when suddenly (he must have breath) he gave a snort that spurted the milk all over the deacon "I knew it would come to this," he says, "I knew it would come to this, just on account of Maria's forgetfulness. Bossy, bossy, bossy." The calf gave another snort, and the good deacon could stand it no longer, and straddling the calf's neck, he seized both ears and plunging the little fellow's neck in the kettle he said: "If it wa'nt for the love I bear my blessed Lord and Master I would punch your cussed head off."

Well, there are people in this world who would have taken good old Deacon Coolidge in that hour and measured him by one of the seventy articles; but I have an opinion that the Lord had considerable sympathy with Decon Coolidge on that morning.

**Calf-Rearing.**—One thing I want to say soberly, now, in regard to the rearing of the calf, and that is this: It is said that the women of Holland are the most successful of any people in the world with cattle. Why? Because they come to the contemplation of the needs of these babies from the standpoint of their own motherhood. They understand that this is a *baby* calf. The women of Holland rear the cattle of Holland. I have noticed a great many men in their management of young stock, and have thought thousands of times that if they would delegate it to their wives they would save many very costly mistakes.

Now, one of the points that I would make is this: The calf comes into the world with a baby stomach. No mother attempts to take a puling infant and immediately to pour solids into its little stomach. Nature handles

this question from her own standpoint, and if we have an ear attuned to nature and an eye clearly visioned to nature, we can go along, even though we do not read Sanscrit. We can understand the things that belong to us.

This calf is a baby, and for the first four weeks in its history it has what is called a rennet stomach that must take food in the form which nature has designed; it passes then slowly out of the rennet stage into the ruminant stage, when the calf begins first to chew the cud. This varies from four to eight and ten weeks. Now, an observant rearer of calves will easily notice when a calf shows a disposition to commence to chew the cud, and he will never force solids upon the little animal until he shows a disposition of this kind. We should commence carefully with the calf in this way, and also take another lesson from nature. Nature when left to herself turns the baby calf out with his mother, and he will take his food from ten to twenty times a day. I have studied and watched these little animals many times and noticed how many times they will take their food. If you will follow that law and give the calf his food as often as possible, give it to him in small quantities and give it to him as his mother gives it to him, sweet and warm, you will come as close to nature as you can. Nature don't give a calf sour milk unless it is a Texas cow, and she is ugly enough to give sour milk. I would maintain that practice with the calf till he is six months' old. Feed the calf at least three times a day. Don't let him get so hungry that the stomach is filled with a gnawing gastric juice; then he gorges and bloats himself and brings on dyspepsia. Never allow a calf to occupy wet or damp quarters; that is one of the most important things.

**Organized Efforts.**—My friends, we have to-day before us, in Wisconsin, a very encouraging state of affairs. You don't know how gratefully comes to me the prospect of seeing the great agricultural thought and intellect of the State awakening in vigorous life to the importance of a stronger and better intellectual condition in behalf of our calling. We are in a most favorable condition; these organized efforts are taking hold of our minds and gradually making them homogeneous. There are, of course, men in the State without thought or idea of the value of rubbing against their neighbors, but the Institute work has come and has come to stay and to tell in every community through which it passes.

**Beginning of Institute Work.**—The other day, at Lake Mills, at the Institute there, I sketched for a few moments the feeble beginning in Wisconsin of this Institute work. Let me follow it now for a moment. The first beginning of practical Institute work was in the little basement of the church in Lake Mills, in 1870. It was the organization of the Jefferson County Dairymen's Association. From that, meetings were organized and held in a few places in Jefferson County, and one day in 1872, at a meeting in Jefferson, your humble servant was authorized by a vote of that little association to issue a call throughout the State, asking the people who felt an interest in these matters to come together at Watertown and form a State Dairymen's Association. Six gathered there, and they deliberated and established an organization—and then commenced the first practical organized effort under State auspices for the growth of knowledge, and for the improvement and betterment of our ideas and practices.

That association had a very tedious

and hard road to travel for years; but gradually it began to force conviction upon the people. The people began to see that there was a Messiahship in this work; that men had come with ideas to offer to each other, and you remember the meeting of the association a few years ago in this city.

Now, that was the first practical effort, and we have gone on from the organization of the State Dairymen's Association to take a wider and broader understanding of our duty to each other.

**The Almoner of Wisconsin.**—Some of those duties have been touched upon practically here. We have been engaged in discussing the money-making side of this work, but there is a broader side to the farmer than simply his pocket. He stands to-day not alone a money-maker in Wisconsin, but the almoner of her destiny; he stands as the repository, to a large extent, of the moral and political conscience of this people. To him must be referred, year after year, as a grand juror, the questions that are to effect the well-being of this people, and these meetings are doing more, my friends, to get us to understand and expand the broad relations we bear to each other, than anything that has happened in the course of our lives.

**Wisconsin's Population.**—We are a peculiar State. We have absorbed into our body politic so vast an amount of foreign material that it is a question whether the process of assimilation shall take place in a harmonious and intelligent manner or not. We have in Wisconsin a population composed of representatives from almost every nation on the globe; our population to-day is 70 per cent. foreign born and their descendants, and we have not thought of this as we ought to have thought. By the census of 1880, there are 40,000 more foreign born voters in Wisconsin than native born, and they are welcome here to our best citizenship. But we need some process that shall take hold of them; that shall make the German feel that he is no longer so much a German as he is an American; that shall make the Englishman feel that he is no longer so much an Englishman as an American; that shall make every man feel that the grandeur of American citizenship stands before him, and that citizenship is the stamp that gives to all character its true value in this country.

**The People's College.**—Now, to the farmer is delegated to a large extent the growth of this principle, this idea of citizenship. I want to see the farmers of this State take hold of the question of education in a grand and substantial manner. I want them to see to it earnestly that the little district school shall become the people's college as it ought to become; I want the country school-house raised and dignified. We have our colleges and our high schools, and the University, and God speed them all, but the country school, the farmer's school, lies at the root of things, and too often is weak and expressionless. My friends, I want in this Institute work that we shall see the necessity of establishing a ground-work of intelligence. How are we to become intelligent farmers; how are we to carry on our business; how are we to make money; how are we to form ourselves as worthy citizens of a most worthy State unless it be by intelligence?

**"By the Sweat of Your Brow".**—God says "by the sweat of your brow shall you earn your bread." He did not say by the sweat of your back; he did not say by the sweat of your hands, but he has put that very action and that very place of struggle where it be-

longs—in the head. Read between the lines and see if he does not mean that if you don't think you shall not have much bread. We need thought and we need encouragement; we need to encourage each other, we need to stand by each other.

**Good, Hard Thinking.**—The agricultural interest is attacked on all sides, but let me say to you, in all conscience, I believe to-day that the farmer himself in Wisconsin is his own worst foe to his own well being. It is not the monopolists, it is not the politicians, it is not the capitalists, but it is the fact that the farmer himself has not seen the broad gauge to which he should attain for the purpose of emancipating his own business from the thraldom that has encircled it. That thraldom is a lack of good, hard thinking, not hard work.

**What Education Does.**—Go where you will in Waukesha County, show me the man who is intelligent, the man who reads and studies, the man who follows the lines of thought connected with his pursuit, and that man I will show you almost invariably is the successful man of his class. Now, then, if intelligence is a stepping-stone to success, we need to understand that we must lay broad and deep the foundation of intelligence.

I read a little story when a boy that touched me deeply, concerning John Philpot Curran, the noted Irish barrister. At a banquet to which he was invited by the Prince of Wales, the question went around: "What has education done for you?" Education is not schooling, it is thinking; it is the assimilation of knowledge, not putting on a man a veneer; it is not cramming; it is not polishing a man on the outside, by filling him with digested thought and digested understanding, making him capable of doing something. The question went around the board, and finally it came to Curran, and he rose and said: "Education has done this for me, my lord—It has enabled the son of a poor Irish peasant to sit at the table of his prince." And it is recorded that the Prince of Wales took offense at that statement, and never again was Curran asked into the presence of royalty. More shame be it to royalty!

I am glad that my own country gives me a thousand such examples as this. The poor boy who has struggled with thought, who has struggled with ideas, who has struggled with undertsanding, who has reached up and asked day after day, "Oh, Lord, give unto me understanding," in prayer as honest as ever went out of the human heart—that boy has a right to feel that on him has been stamped the insignia of God's best grace, the hunger and thirst for knowledge. The man in the old story was asked which would he have, wisdom or riches, and he chose wisdom and God gave him both.

**The Country School-House.**—We need in our relations as farmers, in our neighborhood relations, in our school-district relations, to stand by our little institutions with more loyalty, and that is the reason I made a short plea for the country school-house, standing "like a ragged beggar by the roadside," the desks scarred with the rough touch of the rude jack-knife, the only temple of knowledge that I ever found, and the only temple that ever gave me a start on the road to a better understanding. I see it to-day as it stands upon the rugged hillside in New York; I see the different teachers who came and went to the last day of my school-boy life. I remember one teacher who took hold of my understanding and held my heart, and who, I am sorry to say, found

no answer in the thought or conviction of the people of that district. He taught me things; he taught me to understand animals; he taught me to understand the plants by the road-side; he taught me to look out into the arcana of nature, as far as I could go, and said to me: "Remember, my boy, that all these things spread out before you are yours, and given to you for your use." That man started within me a thirst for knowledge that no other man ever did, but it was said of him, by the rude neighborhood, because he took the boys out in the afternoon and let them down into the secrets of nature, took them down into the meadow and showed them the difference in grasses—it was said of him: "He is a consarned fool, and don't half earn his money." Out of that little rude neighborhood there grew a class of boys who will feel to their latest breath the stimulous that man gave them. Now, we ought to make our little country school-house the center of our civilization. We ought to encourage all these things that shall take hold of the boy.

The Boy and the Book.—A poor German boy came into my office about six years ago, with a gentle, kindly face and a mild blue eye, and stepping up bashfully, said: "Is this Mr. Hoard?" The moment I saw him my heart was drawn to him. He drew a long breath, and I could see in the thin clothing on that cold December day the beating of a stout little heart. He was about sixteen years old, and he said: "I came to ask you, sir, if you would lend me a book?" Why, do you know, at that very moment it seemed as if the boy and myself were welded together. Then I remembered in the diary of my grandfather, written on the 10th day of October, 1788, this little entry: "Rose this morning at four o'clock, went into the woods and burned brush; went back to breakfast at six; had mush and milk. Father sent me over to Uncle James' to borrow his almanac to see when the moon changed. Mother said she "*wished I had a book.*" Poor boy, away back there in 1788 laying the foundation of the knowledge of today. Out of his ignorance have we reaped grand results; out of the poverty of those men has been builded this nation, and shall we not religiously and conscientiously develop and maintain these institutions and promote knowledge? When the child asks for a book shall we give him a stone?

When the boy stood there I questioned him and asked: "What kind of a book do you want?" and it seemed as if it were the return of my grandfather's request, "I want a book." He said, "I would like a book, I don't care what it is—a book that will teach me something." So I led him to the book case and asked him what he wanted, and what his desire was, and he said that he wanted to know something about cattle. Well, he touched me still closer, you know. I asked him if he couldn't get any books at home and he said no. "Father says that I know enough now, and mother said (oh, I tell you these mothers help the boys out grandly) that she knew you would let me have a book if I came down here, but not to tell father anything about it." Now, the mother reached into the boy's heart; she knew his longing. I gave him the book he wanted and he came back and wanted another and another, and I say to you that that poor German boy will some day be a pride to his mother and to the State of Wisconsin.

The Hope of This Nation. — These things make me glad because they make together for peace; they are encouragements; they help us in our work. We

sometimes get discouraged as agriculturists out upon the farm, we think nobody appreciates us and we have a hard life; but remember that out of this great, broad agricultural heart is coming the future of this country; that from it is recruited the statasmen, the managers of the great business enterprises, the blood and the brawn that is the hope of this nation.

**Stand by Your Own.**—Standing in the Produce Exchange in New York City, a few years ago, I looked over the five hundred men who to-day represent and control the commerce of this nation, and I said to Mr. Armour, one of the Armour Brothers, who was a farmer's boy: "How many of these five hundred men do you think were born on a farm?" I was astonished when he told me that eighty out of every one hundred of these men who were controlling the commerce of the nation were born on the farm.

Then I asked him, "what about their sons?" and he shrugged his shoulders and said: "Degenerate sons of worthy sires. The city is a great mælstrom; it is a great hopper; it grinds up human flesh and blood, but the farmer's boy, of all other boys, is the boy who can stand the grind."

Stand by your own. Stand by your own farm, your little school-house. Stand by everything that belongs to you; magnify your calling; don't belittle it but magnify it, and thus shall the blessing of God follow.

# MISCELLANEOUS PAPERS.

## ONE WAY TO INCREASE FARM PROFITS.

By PROF. E. S. GOFF, Madison, Wis.

**The Plan Suggested.**—You will all agree that if there is one thing that the farmer needs to know more than any other at the present time, it is how he may increase the profits from his farm. Prices of produce rule low. Labor and taxes are high. The profits on staple farm products are becoming so small that many farmers are anxiously inquiring how they can support their families and keep out of debt, or still worse, how they can meet the interest on debts already incurred.

If I were to offer a plan with the claim that, by observing it, you could grow wealthy in five or ten years, you might well question the soundness of my views, for fortunes are not often legitimately made in that time. But I have no such plan to offer. I shall, however, suggest a means by which I think it will be possible for some farmers to reduce their cost of living, and at the same time increases the comforts of their homes, and which, if wisely carried out, will, in certain cases, enable the farmer to materially enhance the net income from his farm.

**The Cost of Living**—On the farm depends largely upon the proportion of the articles consumed that is produced at home. The ordinary farm supplies the family with flour, meat, potatoes, and dairy products. These are the bare necessities of life. If the housekeeper has no other place from which to draw, she will find it very difficult to supply her table with a pleasing variety of wholesome dishes during the whole year. In early summer the salt meat and shriveled potatoes are poor supplyments to the grainary and dairy, and the palate tires of sameness at any season. Either the farmer's living will have to be narrowed down to an unpleasant and unhealthful monotony, or else there will be a great void in the bill of fare, that must be filled from some source. This void may be, and very often is, filled from the grocery. Here the housekeeper may select from a large number of preparations that are convenient to use, and which make very palatable dishes There are oranges, lemons, figs, dates bananas, pineapples, raisins, prunes, dried currants, cocanuts, rice, chocolate, tapiaco, sago, and other products of tropical climates, that modern commerce brings almost to our door. But have you ever stopped to count the cost of the food preparations that we buy at the grocery? Let us take for example raisins and dried currants, produced, we will suppose, in the islands of the Mediterranean, and which have been transported nearly 5,000 miles before reach-

ing our table. The grower of these products has been paid for raising and marketing them—not very well paid, it is true, but perhaps quite as well as is the farmer when he sells corn and potatoes at present prices. The packer has been paid for assorting, packing and labeling them. The steamship and railway companies have been paid for carrying them nearly a quarter of the way around the earth. They have been through the custom house and paid Uncle Sam a tariff. The importer has taken a slice for his profit, and the retail dealer who hands them out to you has had his share, and all of these margins must come out of the consumer. By using these products you are permitting several men and corporations to reap a profit out of your hard labor. Can you afford this? Will you buy all these good things that the family needs? Money is not always plenty, or you do not have time to go to market as often as things are needed for the table. You do not enjoy taking out your purse and emptying out a part of it on the grocer's counter every time you go to town. The result is you are tempted all the time to scrimp, and the housekeeper is compelled to do without much that she would gladly have. We sometimes know better than we practice.

**Reduce Your Grocery Bills.**—What I am about to say is not new. You have doubtless all heard it before, and some of you have probably already guessed what I am about to urge upon you. There is a way by which you can reduce your grocery bills, and at the same time increase the comforts of your homes, and the wholesomeness of your diet; and this is by providing on the farm a first-class garden. This will furnish you with an agreeable and wholesome variety, for every day in the year. There will be a very small void to fill from the grocery. For instance, as soon as the ground thaws out in the spring, we may have parsnips and salsify from the open ground. These may be followed by fall sown spinach, and this by asparagus and lettuce; these in turn by green peas, and these by string beans, early cabbage and cauliflower; these by sweet-corn and melons, and these by turnips and celery, the latter bridging over winter and lasting until the ground thaws out again in the spring. I have by no means exhausted the list of vegetables, but we will take another example: Strawberries come in about the middle of June. These are followed by raspberries and currants and gooseberries, these in turn by blackberries and the autumn raspberries, the latter lasting until hard frost. Then if the surplus of all these delicious fruit, has been prepared by drying, canning or made into jams or jellies, as the good housekeeper knows how to do, it will furnish an extensive variety of most wholesome and palatable delicacies until June comes around again, and fresh strawberries are once more available. I mentioned only the small fruits I might have added others, but I have chosen these because the small fruit garden may be started very quickly, and the plants with proper protection indure the winter in all parts of Wisconsin.

**Buying or Raising.** — But perhaps some of you are saying without words: "This all sounds well enough on paper, but we know that we can buy these things cheaper than we can raise them." Are you sure? Have you figured upon it? Let us see. The market gardner's land is worth twice or thrice as much as yours; he pays about twice as much per acre for labor and fertilizers as you do; he sells his products for about half what you have to pay for them at the grocery,

and then, as a rule, makes more money on his investment than you do. Otherwise how can he support his family on a few acres, while you require a whole farm to do it? There must be a mistake in your computations. I do not know why the garden should be such a bug-bear to the farmer. As a matter of fact, no one else can have a garden so cheaply. He has the land, the tools and the fertilizers already. All he needs is the will. The old idea that the garden must be cramped up between four short fences, and that all the work in it must be done by hand is a relic of barbarism Next to an energetic man, the horse is the most valuable tool ever put into the garden. With a very few exceptions all garden crops may be cultivated freely with the horse. The garden should be laid out with long rows, and a good broad space be left across each end, to turn the horse on. Arranged in this way, but a few minutes will be required to cultivate it out, and by watching chances, the weeds may be kept down with very little interference with other work.

**Profits of the Garden.**—I will not here take your time to go into details of culture of the various garden crops. Valuable as the discussion may be, this would form a lecture of itself. As a matter of fact, but little knowledge is required where the will is right. The average garden crop demands no more skill than the average farm crop. Our florist was once asked by a lady: "How do you manage to make your Chrysanthemums blossom so?" "Why, I don't make them blossom," he replied, "the Lord makes them blossom. All I do is to give them a chance." It is just so with the garden. If we but give the things a chance to grow, the kind providence that satisfies all our wants will attend to the rest. I do not wish to say that the garden requires no labor. You and I know better. It does require some labor. So does every crop the farmer grows. But I assert what I can prove, when I say that no half acre on the farm will yield an equal return in dollars and cents and comfort to the one devoted to the garden, provided it is managed in a business-like way. We must, of course, provide for the labor of the garden the same as for the farm. Above all, do not make the mistake, so often made, of feeling that the hired man can never be spared for working in the garden. The boys should be expected to do their share, but should not be compelled to do it all. The boys, and girls too, should be made to feel an interest in the garden, and not to despise it, as they so often do. With this end in view, give them a chance to see something of the bright side of gardening. Buy them seeds of the novelties that are advertised in the catalogues each spring, and let them grow them for themselves. Offer them prizes for the best vegetables, or encourage them to exhibit their products at the fairs. Subscribe for a good horticultural periodical for them, and induce them to grow seedlings and make crosses of their own. Let them dip a little into botany, if they will, and do not cause them to feel that flowers are beneath the dignity of the farmer. And right here let me say that the pursuit of horticulture offers a field for a life work that is worthy the aspirations of the most able and ambitious youth. It has many problems still to be solved that may well engage the highest genius of any age. How may we increase the hardiness of our fruit trees, so that these great Northwestern plains, soon to be the abode of millions of people, shall be able to produce their own fruit? How

shall we be able to conquer the host of fungous diseases that menace our orchards and gardens in such increasing numbers? How can we master the swarms of destructive insects that work such havoc with our crops? How may we infuse wild vigor into our improved cultivated varieties? These and other equally important questions cry out for reply, and he who answers one or more of them is no less a benefactor of his race than he who teaches us how to harness steam or electricity.

**Special Garden Crops.**—In almost every locality there is an opportunity to make some garden crop more profitable than staple farm crops. Either the market demands it or the soil or climate is specially adapted to it. Sometimes this special crop is celery, sometimes it is early potatoes, sometimes it is strawberries, currants, cauliflower, sweet-corn, asparagus or something else. It should be the farmer's effort to discern by careful watching what special crop he can make specially profitable. Here is where the garden may work another great good. Its surplus products will naturally be sold, and a revelation of profits possible from fine early vegetables will thus be made. The real profits of a good garden do not stop at reducing grocery bills or providing home comforts. They often do not stop until they have turned what was a losing into a profitable business, and rolled back the mortgage that was fast enveloping the home.

**Don't Neglect the Garden.**—Let me urge upon you, my rural friends, no longer to neglect this most important adjunct of the farm. Better, if need be, have fewer bushels of corn and potatoes to sell. You cannot afford to sacrifice any of the comforts or rewards that naturally belong to the farm. Your wife and children need the garden; common sense and good judgment demand it; all sound arguments favor it. The garden was the parent of the farm and can never be divorced from it, without entailing damage, if not positive disaster. Supply your own family first, with all the delicacies that your soil is capable of producing, then take the surplus to market. This is the normal condition of agriculture, and we cannot wisely ignore it or depart from it. Whether business is prosperous or not; whether produce is high or low, the garden continues to grow days and nights and Sundays, manufacturing by its own mysterious processes food for your table out of nature's dead materials. It demands no compensation, but asks only opportunity to confer its benefits upon you. Can you afford to do without it?

# WORKING COUNTRY ROADS.

By ROBERT FARGO, Lake Mills, Wis.

**Mud and Mire.**—In this practical age why do we plod on over worse roads that we had forty years ago? Within two miles of where I stand there are places where the roads at this season are almost impassable from mud and mire, and yet with abundance of gravel almost within a stone's throw. Not a mile from this hall, not long since, the overseer covered a good gravel road with clay from either side, making it, later on, impassable for a load, and the public were forced to take another road into town. He put almost the whole tax into that mud. It was lucky there was no more tax.

**How Roads are Worked.**—Lake Mills levies about $2,500 annually for road taxes. The town is sub-divided into sixteen or eighteen road districts by drawing arbitrary lines here and there, to suit the whim or caprice of the supervisors or the tax-workers, with marsh and bogs in one district and fairly good roads by nature in another; with perhaps abundance of gravel, and having in each from two to seven miles of highway "*as it happens to come.*" After dinner, town meeting day, with a hoot and a howl, we choose overseers for each of these sub-divisions, not for their special fitness, and for variety we change them annually, so that in ten years we can have 180 overseers. Nice, is it not? This $2,500 is apportioned to each district not according to needed work on the highway, but according to the valuation in each district, so the best lands, and naturally the best roads, get the lions' share of the tax. Why? The tax is worked out by the owner of land on which the tax is levied. Then, instead of making or repairing the roads as we do our other work, when and where it is needed, the overseer calls out the tax-workers all at one time and season, and at a season, too, when every man's time is almost invaluable on his own, farm. In nine cases out of ten the roads are made no better, first for the reason that the overseer does not know the first lessons in road-making, and, second, if he does, he has a shirking, time-serving crowd to handle, whose chief desire is to get the tax out of the way.

**Collect the Tax in Money.**—Now, what does this $2,500, represent? So much solid cash judiciously laid out in making roads? By no means. It is represented by ruts and mud-holes in the spring, holes, sags and snags in summer and hubs in winter. What would this $2,500 have done if collected in money and laid out as it might have been? It would have macadamized the 45 miles of road in the town *twice*, at a cost of $1,000 per mile, and $10,000 would have been left for repairs, in the last forty years. Get out your pencils and figure what could be done with $2,500! It would employ three double teams and three men at $3,00 per day, and five men at $1.25 per day, for six months (156 days), with no let-up for rainy days, and leave $141 for extras. I venture the assertion that they would accomplish more than has been done in the last ten years.

**You Can Stand the Tax.**—But you say, "we can't stand the tax?" In this county the taxes have grown from $25,-131.64, in 1880, with a population of 30,438 to $93,547.97 in 1888, with a popu-

lation estimated at 33,000, and you seem to stand that, and don't get any returns, either, except in school moneys. Is your time on the road *pretending to work valueless?* Would not good roads minister to your comfort and improve the value of your lands?

**Civilization and Good Roads.**—It is said the history of civilization is the history of good roads. Then, measuring ours by the "Appian Way," or the later work of McAdam and Telford, the wheels of civilization have taken a backward motion, and we may soon look for the sun worshippers in high places.

A recent writer on roads and road-making, says: "Roads form a primary element in the advancement of a nation being essential to the development of the material resources of the country." Notwithstanding these axiomatic truths, so terse and vivid, that should appeal to the average farmer for the best methods along this line, we find a hardened indifference that can be explained only on the theory that familiarity breeds contempt. He plods his weary way to the town or railway with his load of produce, thinking by contrast of the "happy land" and "golden streets", when, perchance, a smash-up transforms this saint-like citizen into a low-down "cussing" fellow. He will "cuss" the roads, "cuss" the road-master and "cuss" his luck; but when "those days in June come round to work out the tax," he is the last man there; the first to leave, the biggest shirk; he can tell the best story and cheat himself.

I am here to plead for better methods in road-making. Will some hard-fisted farmer who has lived here for the last forty years tell me how much better the roads are now than then (save the sluices and bridges)? In that time steam and lightning have been chained and taught to do our bidding. We cannot turn in any direction without being confronted with devices to minister to human comfort, except the roads we travel on.

**The Only Remedy.**—There is only one remedy, and that is to *collect the tax in money*, and have it expended by a commissioner appointed by and under the direction of the town supervisors. Any town that will, can adopt that method by a vote at their annual town meeting. If the people are timid, begin with a one or two mill tax, and when the result is seen there will be no trouble with those who have eyes and nerves. This will be no experiment. It has been in successful operation in some of the New England States for years. The town of Whitewater is a notable example of this method. They had formerly some of the worst roads in the country; they now have the best I know of in the State and it has been done with an annual tax of from two to three mills, about half what most towns pretend to work out. The work is there applied where and when it is most needed, and mudholes are not allowed to remain from the first of August to the first of June to "get their fill," and there is no nonsense in road-making.

# TILE DRAINAGE ON THE FARM.

By C. P. GOODRICH, Fort Atkinson, Wis.

**Importance of Drainage.**—The subject of drainage is of very great importance to all parts of the State, both as regards the health of the inhabitants and the value of land for agricultural purposes. There is not a county, not a town and very few farms in the State that would not be benefited far more than the cost of the work by a judicious outlay of money in draining low, marshy, malarious and disease-breeding tracts of land, and transforming them from unsightly and repulsive blots on the otherwise fair face of our delightful country to valuable pastures and meadows, and, in many cases, to the most valuable and productive fields to be found for the raising of any kind of grains. The draining of a swamp or marsh in a town benefits every inhabitant of the town by making it a more healthful and desirable place to live in, and in consequence the selling value of every farm in the town is raised even though none of the drained lands are situated upon or even contiguous to it.

**Difficulties to be Met.**—One great difficulty in the way of drainage has been that it seldom happens that any one man owns all the land that would be directly benefited by, or that lies along the course of, any particular drain, and it would require concert of action and a mutual expenditure of money by those interested to accomplish the work. This concert of action is often very difficult to obtain, owing, in some instances, to the inability of some men to fully realize the importance of the work, and in other cases to the natural selfishness of men who, though they would consent to be benefited, would refuse to bear any portion of the expense, claiming that it would be of no benefit to them. To obviate this difficulty, laws have been passed in this State, whereby town and county boards can lay out and construct such drains, and the cost of construction can be assessed upon the lands directly benefited according to the amount of benefit to each tract.

In some parts of the State considerable attention is being turned, of late years, to this subject of drainage, and much benefit has accrued to the people by the application of this law. Still, I do not think it advisable to resort to the law if amicable arrangements can possibly be secured without resorting to it, for the expense will usually be less if done by private enterprise, and will generally result in better feeling between neighbors. But where it cannot be avoided, men should promptly take advantage of this very just law rather than longer delay work so important.

In my own town several town drains have been constructed with very obvious benefit, and although, in some cases, they were opposed with an energy and determination worthy of a better cause, still, when they were completed, and the improved appearance and productiveness of the land became apparent, all, even those who had been most bitterly opposed to the scheme, were constrained to admit that it was a "good thing."

**Tile Draining.**—Tile draining has been practiced in Europe many years; but the first done in this country

was in the State of New York, in 1835, and the tiles were imported from England. The first manufacturing of tiles in this country was done in 1838, by a Mr. Johnston, of Geneva, N. Y., for underdraining his own land. They were molded by hand over a stick, and he claimed that notwithstanding the great cost it proved profitable. Since then tile machines have been introduced and perfected, so that they are now made very cheaply, and great quantities are used in all the older States where land is valuable, and even in Wisconsin they are rapidly coming into use, and generally with great profit.

Lands Benefited by Tiling.—All heavy clay lands with a retentive subsoil, especially if lying nearly level, must necessarily have the productive soil thin, because it is saturated with water and the roots of plants can not penetrate much below the surface, so that when drouth comes the ground bakes and cracks and the plants look yellow and sickly because they have but a feeble hold on the soil. Such land will be made immensely more productive by under-draining, for that removes the excess of water and makes the soil deeper, more porous and mellow, and better able to withstand either wet or dry weather. It may seem a mystery to you, as it did to me, how water can find its way from a distance of a rod or two underground through such apparently impervious clay to the tiles. I might say, as did the workman who was putting in my first tile drains: "I don't know how, but I *do know* that it does it." And I found that it did do it. It did it much more effectively the second year, and drew the water from a greater distance after the ground had been deeply frozen during the winter, and it did still better the third year. My theory is this: The tiles are and must be laid below the line of frost. When land saturated with water freezes it expands, or, as it is said, "heaves." If it is thawed out with all the water still in it, it soon settles down to its former compact state; but as it thaws in a great measure from below, the water is partially drawn out from below as fast as the ground is thawed, thereby preventing its becoming again so compact, and the water forms small channels whereby it can get to the tiles. Then little channels increase in numbers after each year's frost, till the character of the soil seems completely changed, so that instead of being cold, sodden and water-soaked till late in spring, or after heavy rains, it can be worked with ease as early in spring or as soon after rains as any land.

Another kind of land that can be greatly benefited by tiling are our lowlands, some of which have inclination enough for surface drainage, but are kept cold and wet by water rising from below.

The greater part of the rain which falls on the uplands where there is a porous subsoil sinks down into the earth, and this water must find its way out somewhere. Much of these lowlands of which we are speaking is underlaid with a thin stratum of clay, through and below which are streaks of sand and gravel. Now, if the water line through the porous earth under the uplands is higher than the surface of the lowlands, the pressure of the water on the higher level will tend to force the water under the lowlands up through this thin stratum of clay. This it does, sometimes in the form of springs, but more commonly all over the surface, or, it might be said, in an infinite number of very small springs. Some lands that seem quite solid and dry and were never suspected of being springy, but for some unaccountable

reason are cold and unproductive will, by close examination, be found to be of this class. Now, if a sufficiently deep outlet can be secured and such land tiled, say four feet deep, or deeper if you can—the deeper the better—with lines from three to four rods apart, it will intercept this cold water and carry it away before it rises high enough to injure vegetation, and transform land which will produce nothing but the poorest kind of marsh grass, into the most productive land in the country, which will bear large crops of any kind of grain or grass in any season, whether wet or dry.

I have tiled some such land as this. It is the first land I can plow in the spring and the first I can cultivate after a rain, and produces larger crops, no matter whether the season is wet or dry. Water has constantly discharged from the tiles for four years, not ceasing in the severe drouth of last fall. Frequently water oozes out of the ground at the base of a hill by the edge of the lowland and soaks out upon it, keeping it wet for a long distance. In such cases a line of tile run along the base of the hill at a good depth will cut off this supply of water and dry the land for a long distance. I have one such place as this where the land has become solid and dry ten rods below the tile where formerly it was frequently too soft for horses to go on.

One kind of wet land it will not, in my opinion, ever pay to tile—that is where it is composed of nothing but peat to the depth of three or four feet. It can be dried out, but then it will be so light that it will produce nothing. The best that can be done with such land is to drain off the surface water and then pasture it or mow what little poor grass may grow on it.

**Manner of Doing the Work.**—First, a good outlet into an open ditch or brook must be secured, at least 4 feet deep; then lay out the lines for the tiles where, in your judgment, they will do the most good; but they must have a little fall through the whole length of each line. It might be convenient to have an engineer do this, but the owner of the land, if he has good judgment, and has observed the flow of water over the surface in times of heavy rains, can do it without the help of an engineer. One inch fall in 100 feet will do, if no more can be had. The distance apart of the lines necessary depends on the kind of land. If very retentive clay, they should not be more than two rods; in some other lands four rods will do as well. The ditch should be made as narrow as possible, and give room to work in, say 18 to 20 inches wide at the top and 6 inches at the bottom. The bottom of the ditch can be smoothed and fitted for the tiles with a true, even grade, with a scoop made for the purpose. If there is a little water running in the ditch no trouble will be had in getting the grade correct. If there is no water some kind of a level will have to be used. Lay the tiles in so they will fit as closely at the joints as possible. If there is water running in the ditch you have to begin at the upper end to lay them, otherwise the running water will carry mud and sand into the tiles. If there is no water you can begin at either end. Cover the tiles with a little marsh hay or straw or something of the kind, and then put on a little earth (clay is preferable) and pack it down well. The rest of the filling can be done quickly with a team and scraper or plow. Three-inch tiles are large enough for short lines, but if they are more than 60 yards long, or are in places where considerable water is likely to run, then larger ones should be used.

**The Cost of Tiling.**—It has cost me 25 cents a rod to get tiles put in 3½ or 4 feet deep. Last summer I paid 30 cents for some but a part was through a cut 5 feet deep. Tiles cost at the factories in the southern part of the State $10 per 1,000 feet of 3 inch and $15 for 4 inch. At this rate it would cost to tile an acre with 3 inch tile, 4 rods apart, $16.60; 3 rods apart, $24.90 and 2 rods apart, $33.20.

Now, the question for each one to ask himself is: "Have I any land that it will be profitable to tile drain?" The correct answer will depend on circumstances—the value of good land and the cost of labor and material in your locality, as well as the kind of land you have. If the cost will equal or exceed the value of good land, then the decision would doubtless be against doing the work except in special cases, such as where there is a wet place in the middle of an otherwise good field of plowland; or where there is a narrow strip of wet land running through and dividing a field in such a manner as to make it very inconvenient to work; then it may well pay the cost even though the value of an acre is no more than the expense of tile draining it.

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## GRAPE GROWING AS A PROFESSION.

By WM. FOX, Baraboo, Wis.

**Not Acquired in a Day.**—Successful grape growing is not acquired in a day, a month, or a year. It has to be learned gradually, and by patient observation and practical experience, line upon line, precept upon precept, here a little, there a little, year after year. This makes the grape culturist proficent in his vocation, and then he can continue to learn something new and important in regard to it during the whole of his life-time.

In the last ten years it has been demonstrated that we can raise grapes as well as any other Northern State.

**Location.**—The location of the vineyard should be on a hillside sloping preferably to the south, although the earlier varieties succeed well on a northern slope.

**Soil.**—It used to be said that grapes would grow on the poorest soil, but in my experience it takes the very best, which also needs to be fed liberally from year to year. All soils are not good for all kinds of grapes. Delaware, Brighton and Lindley, when once thoroughly established, do their best on clay soil; they also do well on heavy clay loam. Concord and its seedlings do very well on most soil but best on clay loam; Catawba, Diana and Roger's Hybrids, sandy loam, or dry and porous soil, with a good, healthy exposure to plenty of fresh air and sun; Iona and Cumberland, on black muck soil. I speak of these points from my own experience. All our grapes do best on land well cultivated and properly drained. Grapes should not have wet feet, nor will they do well with them, for with the ground wet it is cold and unhealthy which causes the vine to decay, and they soon die from premature old age. This will not be the case on land that is well drained so that heat and air can penetrate to the roots. If land is wet I would advise tile laying.

**Preparation of Soil.**—The next im-

portant step is preparation of the soil, which it is to be presumed is drained. Deep plowing is best, following in the same furrow with a good sub-soil plow, breaking the ground as deep as you can. The object is to loosen, so that the fine, tender roots can penetrate it and make a healthy growth in the first year, which they will not do if this plan is not followed.

The old way of plowing shallow leaves the sub-soil hard, and then, too, the hole is often hardly large enough to admit plant and roots. The young roots cannot penetrate the hard walls of their cell; consequently they will seek the softest and most accessible spot, and climb on top of the soil unless, perchance, there is a crevice near-by, into which they will dive down and seek what they must have to live and thrive on, namely, moisture, and they will go down until they find it. All these means, of course, apply to land of heavy clay sub-soil and to light loose soil.

**Selection of Varieties.**—Next comes selection of varieties, which the vineyardist must determine for himself by carefully noticing how early frost comes, and what variety will mature in an average year. I find, with me, that Moore's Early, Early Victor, Worden, Concord, Red Brighton and Delaware, for summer, very seldom fail to mature; for winter keeping, Vergennes, Roger's No. 3, 9, 15, 53.

**Planting and Rearing.**—The next highly important step to be taken is the selection of roots. I would have a first class yearling root in preference to any other. I cut the tops to buds, and have them ready to set. The hole should be dug as deep as cutting is, so that the crown of cutting will come a trifle below the surface when the ground is leveled. I would then set perpendicular, laying in the roots carefully and straight. Any carelessness will not make a good, healthy vine. Cover the roots with loose, fresh surface soil. Well rotted manure or fertilizer will be beneficial.

**Cultivation.**—Cultivate and hoe during summer, and cut back to buds. Cover the vine in winter, and do it well. The second year keep them growing. Cultivate and hoe. Do not let them get stinted. Break away all but two canes; let them grow, and tie them up. Take care that you get ripe wood in the fall. I cut back to two buds and cover again as the year before. In three years the roots will be strong, and you can leave more canes. Be careful and cut away all unripe wood; also take care to not let your vines over-bear. When they do cut them off. I do not believe in extreme checking. Check only for the benefit of vine and fruit. I also cannot see any benefit in breaking off leaves. I find more a lack of leaves than too many. I begin to prune in October, and lay down in November from four to twelve, according to weather.

# BUTTER-MAKING ON THE FARM.

By MRS. A. H. DARROW, Brandon, Wis.

**Beginning the Work.**—When dairying first went into effect on our farm, it was from necessity as well as choice. My husband had raised wheat so long, and was growing poorer each year (and the land no richer), that it became evident a change must be made. The milk was taken to the cheese factory for a number of years with quite satisfactory results at first, but the receipts grew less each year, which was not, of course, very satisfactory. Having become somewhat enlightened, it was decided to procure a creamer. A well of good water close by the house, and a wind-mill to do the pumping, made it quite convenient. The creamer and pump were inclosed in a small building, and we proceeded to the business of manufacturing butter.

**The Right Kind of Cows.**—The right kind of cows is one of the essentials to success—those that will manufacture the food they consume into milk of a butter producing quality. The feed given should be the very best the farm can produce. The care of these cows is of great importance. This includes warm stabling in cold weather, warm water to drink, dry shelter at all seasons of the year, and regularity of feeding and milking. Too much stress cannot be placed on the latter point, also on the cleanliness practiced in caring for the stables and all utensils used in caring for milk and butter.

**Care of Milk and Cream.**—Milk should be taken from the stable as quickly as possible after being drawn from the cows, for the double reason of getting it away from the odors of the stable, and that it may be strained before having a chance to cool. In spite of these efforts, in winter, the temperature will fall to about 90 degrees. We add warm water (not scalding) to raise the temperature to 100 degrees. Prof. Robertson gives as a reason for so doing: "It washes off the fibrine, caseine and albumen which accumulate on the fat globules and permits them to rise more rapidly through the milk. Cream from milk thus treated will also churn more rapidly than cream in which these other substances remain." Our reason for adding the water was to procure all the cream. The cans are then submerged in ice-water. The greater the number of degrees through which milk falls while cream is rising, the more perfectly does it rise. Wishing to ascertain if we were getting all the cream, we took, some of the skimmed milk, after having been treated in this way, and warmed it again to 102° and re-set it, to obtain the rest of the cream if any should remain in the milk; but not a particle was to be seen.

**Ripening the Cream.**—The cream is kept at a low temperature until enough is obtained for a churning, then all ripened together. This is done by warming to 60° in the morning and letting it remain at a temperature of about 70° through the day, and the following morning it is ready to churn. The degree of ripeness is indicated by moderate sourness. To mix sweet cream with sour before churning is a mistake, for the sweet cream will not churn in the same length of time as the sour, and what butter the sweet cream contains will be left in the buttermilk.

Warming the cream as mentioned is a sufficient "starter," and the cheapest to be obtained.

"New Fangled" Articles.—I believe we are through investing in new fangled articles until knowing something of their good qualities through some one who has sufficiently tested them besides the inventor, and I know of no better place for these experiments to be tried than at the Experiment Station, where those in charge are paid for services and are unprejudiced in decisions. We have had some experience in this line, hence the advice. Being desirous to learn just the good or poor qualities of our cows, we invested in aparatus. Not being successful at first, I wrote to the parties of whom it had been purchased, received more minute directions and tried again. Everything worked well, and, according to the test, it required 200 lbs. of milk to make 5½ lbs. of butter; or 36 4-11 lbs. for 1 pound of butter. We were sure this could not be correct. We then set the milk of the two cows we had been trying to test, to ascertain how much it really did require, and it took 25 lbs. of milk for a pound of butter.

Churning the Cream.—The cream is churned at a temperature of 66° in winter and 62° in summer. The use of a thermometer is all important, that we may be accurate in the temperature. Perhaps some will inquire: "Why be so minute in the small particulars?" Well it is usually the case that the smallest things are those that perplex us most. Your butter might have brought the highest price had it all been colored alike, but as the tryer is withdrawn it displays yellow, yellower, yellowest, and on that account you lost from 5 to 10 cents per pound. Now, had the same amount been churned each time, and the color dropped instead of being measured in a spoon, the "gilt" would all have been the same shade. So the rule proves itself that it pays to look well after small things. When color is used, it should be added when the cream is ready to churn. When the cream has been churned until the butter begins to separate, which is readily detected by the welcome sound, reduce the temperature to 60 degrees by adding cold water, which will also serve to thin the buttermilk. Then churn a little more until the buttermilk will run off free from butter and still leave the butter in small granules. Next wash in weak brine, then in clear water until the buttermilk is washed out.

Salting the Butter.—Now leave to drain a few minutes and weigh salt, allowing 1½ oz. to the pound, more or less, as those wish for whom it is made; 1¾ oz. is as we salt ours, for that is as our customers wish it. After the butter has drained, we salt it in the churn, revolving it a few times, then let it remain draining for about an hour, when the salt will be dissolved; then take it to the butter-worker and press out the brine by the use of the lever. We have tried the plan of discarding the worker, and at times it worked well, and at others left too much brine in the butter, while if placed upon the worker one can see just the condition it is in. We have no desire to sell our customers brine, as they can make it cheaper if they wish it, and we have the consciousness of selling the genuine article.

Packing — Marketing.— After this process, we pack in tubs which have been soaked first in scalding brine then in clear water and afterward rubbed with salt, and the "gilt-edged" butter is ready for market. This method of making butter has given perfect satisfaction to our customers whom we have supplied a number of years; have lost but two, and this was on account of price;

they wanted cheaper butter. After considerable experience with commission houses, we have concluded the less we have to do with them the better, and find it much more gratifying to send directly to "gilt-edged" people who know and appreciate a good article when they get it.

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# HOW TO MAKE AN INCUBATOR.

By F. E. PARSONS, Lake Mills, Wis.

**Artificial Incubation.**— Although the hatching of eggs by artificial means has been proved a success by many people, there are still incredulous ones who fear the undertaking, chiefly because some one with whom they are acquainted has made the attempt and failed. It is generally admitted that if artificial incubation can be made successful it will be a source of profit to the poultry raiser, and as this question has long since been settled by successful poulterers we need spend no time in discussing the feasibility of the process, but devote it to the more profitable task of explaining the process, and in setting forth briefly the manner of its application. All that is needed to hatch eggs in the number of days allotted to the process by nature is to give them the correct number of degress of heat, with proper airing for that number of days.

**Mode of Construction.**—Failing to reach success by the use of a highly recommended *incubator*, I took upon myself the task of inventing one, so that, if possible, I might prove the feasibility of the process. For the purpose of this, I secured a sound dry-goods box, with matched joints, three feet long, thirty inches deep, and thirty inches wide. I removed the cover, stood the box on end, with open side to the front. I then passed through it, from side to side, four half-inch iron rods, equal distance from each other, as a resting place for a sheet-iron floor. These rods were eighteen inches from the bottom of the box, which, for safety, was lined with tin up to about two inches above the rods. The sheet-iron floor was cut to exactly fill the box, thus dividing it into an upper and lower room. One-fourth of an inch from the edge of this floor I punched half-inch holes, four on each side, and in the middle I cut a six-inch round hole. The lower room was intended for the heating lamp, and the upper one for the nest. I made the nest box two inches smaller than the inside measurement of the large box, and high enough to reach from the floor to within one inch of the top of the main box. The top of the nest was covered with a wooden top large enough to touch the main box on all sides, thus projecting over the nest one inch all around. To this nest I put no bottom floor, and left the front open except four inches at the bottom. I then procured at the tinner's a galvanized-iron tank four inches deep, just large enough to fill the inside measurement of the nest, so that when the nest was placed over it, both could be set upon the sheet-iron floor of the main box, and the tank be exposed to the heat from the lamp below. To close the open part of the nest in front, I

hung a door to the four inch piece in front of the tank, with a spring bolt to hold it at the top when closed. In this door I placed a window 6x3 inches, back of which was a thermometer, inside the nest, by which I could tell the degrees of heat at any time without opening the nest. Inside the nest, on the right and left were cleats, five inches apart, on which the egg-rack rested. In the top of the tank there were eight quarter-inch holes for the escape of vapor upward among the eggs, and one at the front top, ¾ of an inch in size, for the purpose of filling the tank. I closed the front of the outer box with two doors; one hung at the side for the bottom room and one hung at its bottom edge, on a level with the top of the tank, held in place when closed by a spring bolt. In the cover of the nest box there were half-inch holes, corresponding with those in the sheet-iron floor below, and also a few quarter-inch holes over the eggs for the escape of heat and draft. In the top of the main box I cut a four-inch hole to act as a chimney, and in the bottom a few auger holes to secure a free circulation of air.

**Results.**—With this incubator I received a better return in healthy chicks than I received from the hens which were incubating at the same time. By repeated tests I found that 95 to 100 degrees of heat is best for success, and that twenty minutes airing and a complete turning of the eggs every day is absolutely necessary. I found that removing the eggs from the nest, and keeping the incubator closed during the airing of the eggs, is the best method, and that by having an extra egg-rack to lay over the filled racks, an entire rack of eggs could be turned at once by holding them tightly and turning them over with the hands.

**The Brooder.**—When the chicks are hatched they should be removed to the brooder when dry and strong, and fed a little yelk of hard boiled egg mixed with bread soaked in milk and squeezed as dry as possible; a very little food at once, but given often, is the way to feed them. A good brooder should be high enough from the floor or ground to admit a lamp underneath and a free circulation of cool air under its floor, as chicks must have their backs kept warm, and their home must be always dry. A brooder is a box long enough to contain a tank for water, the bottom of which should project below so as to come in contact with the heat of a lamp, and the top should be tightly covered so that the heated tank will keep it warm and dry; a part of the top should be glass. At four days old chicks should go out into a pen where they can scratch in fresh earth. The lamps can be small both in the incubator and brooder, and the food after three or four days can be bread, boiled potatoes, corn bread, dutch cheese, etc., with clean, fresh water always within reach for drink. Never let the chicks get wet or cold.

**The Egg-Racks and Tank.**—The egg-racks are frames one inch deep, with cross strips about an inch and a half apart beveled on both sides at top and level with the frame at bottom, covered below with wire screening nailed fast to both frame and cross strips. In the gutters between the strips the eggs are placed, and will remain firm in place when another frame or rack is placed upon it bottom upward for the purpose of turning the eggs. The tank described will heat about a pail of water which will last for months. The water should be put in hot (to save time), and kept hot with the lamp, so that in the nest 97 or 98 degrees of heat will be found steadily. Too much heat is death, but 103 degrees is safe. Too

much cold is also death, but occasionally at 90° will do no harm for a few moments.

**Poultry for Profit.**—To raise poultry for profit the incubator is a great helper, for it saves the time of the hens, enabling them to return more eggs, and the brooder properly made and managed is much better than the mother hen. With the same number of hens to furnish eggs, it is safe to say that twice the number of chicks can be raised by artificial incubation and brooding, than can be raised by using hens from among the layers as incubators and brooders. There are a large number of people in the United States making fortunes raising poultry for market, and the most prosperous ones have discarded hens as incubators and brooders, and resorted to the artificial process which enables them to enlarge their buisness almost without limit. Breeders of fancy fowls, who charge fancy prices for their stock and two or three dollars for a dozen of eggs, quite generally disapprove of the artificial methods, but those who make it a business to raise poultry for food think highly of the new method.

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# LOOK AFTER THE BOY.

By MRS. CARRIE S. HOBART, Jackson County, Wis.

**Entitled to More Attention.**—The boy on the farm is entitled to more attention and consideration than he usually receives. It is a common thing to find, not only among farmers but among others, people laboring under the erroneous impression that a boy who is likely to remain on the farm needs very little education in preparation for his vocation, and that a very limited amount of brain is absolutely necessary.

It frequently happens, as Senator Howe once said, that the smartest of a family is sent to college to become a lawyer or physician, and the dullard is thought to be fit only for a farmer, when, if this order of procedure were only reversed, better results might be attained.

Too many boys, owing to a disinclination for school, are allowed to remain away, or obliged to do so that their time may be given to the farm; and this just at an age when they are most capable of applying themselves to study. They ought to be *obliged* to remain till our schools can at least have an opportunity to teach them the value of an education, and so interest them in it that they will never be content with the little knowledge acquired there.

**Have Good Schools.**—Look to it, then, that your schools are what they should be. If they are not, investigate the matter with a view to finding out whether the teacher deserves all the blame, or if, perchance, some of it does not rest upon the shoulders of each individual of the district. Are you sure the teacher receives from you the sympathy and support necessary to make her efforts effective? Keep this thought with you—all the responsibility of the education of my children does not lie with the teacher. Never take your boy from school because he knows as much

as his teacher; just get one who knows a little more.

**Qualifications.**— Can a farmer know too much? Perhaps of some things; but he can not know too much concerning his own business. Does that signify much or little? I would not discourage a small boy thinking to become a tiller of the soil, by reading him a list, at the outset, of the requirements necessary to properly qualify him for the business. What are a few of them? A knowledge of chemistry, something of feeding, drainage and breeding; some knowledge of the structure of domestic animals, how to prevent and cure diseases common to them; political economy, an idea of mechanics. Even if he be a specialist, there are many things he ought to know aside from his line of work, in order to add to his comfort. In addition to all these, he must be careful, painstaking, methodical and practical. What do you think of the length of the list?

Now, the father ought to see that the boy acquires a knowledge of these subjects. What advantages does he give him for such acquirement? Usually the benefit of his own experience. Well and good, if the father is a successful farmer and takes pains to train the boy; but how many, on this basis, feel competent to train him?

**Actual Experience.**— Some farmers who might do much for their sons, are too content to let the boy profit by his example in so far as he may by merely assisting with the work. Too few there are who give them *actual experience.*

Even at the risk of small pecuniary loss, let the boy have either stock or land and be made to feel the loss or gain derived from the use of his capital. Don't give him a pig, sell it, pay him back with another pig, sell it, and so on, for this I know to be most tantalizing treatment, and not at all calculated to inspire him with very great solicitude for the welfare of the third or fourth pig, at the least.

**Means of Information.**—If you are not as successful as you ought to be (I will not say as you want to be) where then will your boy turn for aid? To your neighbors? No, that won't do, for I take for granted you have yourself profited by their experience as much as possible.

Farm journals come next. Do you take one? If you do, are you in the habit of reading and discussing it with your boy? If you have found it a little hard to interest him in your journal, have you tried having it or another sent to his address? It is wonderful what a difference that will make sometimes. Try it; it is a cheap experiment.

Suppose you don't possess the paper and your excuse is, "can't afford it." Did you ever try going halves or quarters with a neighbor, to secure the necessary; or are you one of those we hear of occasionally, who "don't believe in book learning, 'taint practical?" If you are, play Yankee and "figger" out why it is that the lawyer, doctor, teacher and men of *every* profession, except your own, need journals devoted to their work, to enable them to keep abreast of the times.

Take for granted that you have these helps, but are not quite successful yet. Are there any other means of acquiring information? Can it be possible there is a farmer in Wisconsin who does not know of the Farmers' Institutes? Possibly, for it was not a great while ago that I heard a teacher, who had for years taught in the country schools of Jackson County, say she had been in several homes where there was not a paper of any description.

Do you know any who stay away from these institutes, through indifference—for instance farmers who think these institute conductors are *rich, big* farmers and that their experience can therefore be of no use to them? Has this class been here and tested the practicability or impracticability of the information given? I hope they will, at least, give these rich gentlemen credit for not being monopolists. Think of it—rich farmers who don't want to monopolize the knowledge for acquiring wealth! It is a wonder the country does not turn out from mere curiosity to see this rich anti-monopoly band.

Can there be any farmers here who are so interested in the work of the institutes that they leave "bub" at home both days to do the chores? Can it be the boy is deprived of the privilege of hearing these new ways for himself? And think what the youth misses by not being able to tell his friends about what "I saw and heard at the institute." If possible, bring him both days—at least let him come once.

Is this institute the last resort for information? No, thanks to our wide-awake university regents, we have the twelve weeks agricultural course at our State University. Every farmer ought to know what are the advantages of this course, the expense of taking it and, if possible, avail himself of the benefits it may afford. Then, there is the long course in agriculture that the State University offers. Look this up with a view of sending the boy there another year.

Wisconsin's Advantages.—The superior advantages offered by Wisconsin to her farmers are apprecated abroad. The London Live Stock Journal of England, commenting on our agricultural system, among other things, says: "Neither bad seasons, depression of trade nor a faulty fiscal system can possibly keep down a people so intelligent as the inhabitants of Wisconsin prove themselves to be." We find Canada taking great interest in our methods, and sister States marveling at and inquiring for reasons of the success of our institutes. Gov. Hoard says that last winter he received over one hundred and fifty letters, from Eastern gentlemen, all of this tenor: "What is the price of land in Wisconsin? We read much about your institute work. We think it must be a *grand State* to send a boy to occupy a farm, where men can amass information like that for the good of the farmer." When these advantages are duly appreciated by a majority of our farmers, then will be the dawning of a brighter day for the Wisconsin boy, and *not* till then—for it is not to be expected that fathers will be likely to give their sons advantages which they, themselves, do not recognize the value of.

The Boy's Pleasures.—As to the boy's pleasures: Provide him with interesting games, but don't think your duty ends there—take part in them. If he likes fishing—and what boy does not—fix up and go an an excursion for a day or two with him. You will enjoy it yourself.

Try to so manage affairs that either in your company or alone he can visit places of interest in his county or State. Get up a load and go to town when there is an exceptionally good lecture or entertainment to be enjoyed. Let him have plenty of company. In fact, devise every means you can to make him feel that all the good times to be had in the world are not prohibited the farmer.

Good Literature.—Too much attention can not be given the matter of supplying him with good literature. Let him *own* good books and papers. With much of standard literature to be purchased for from 10 cents to $1.00 a vol-

ume, there can be no excuse for any one being without plenty of good healthful reading matter. Of all things don't have in your homes a newspaper of the Police Gazette style, such as many of our dailies have grown to be.

**Public Matters.**— Never let the boy hear you say there is no use of a farmer giving public matters any attention; but endeavor to impress upon his mind the obligations imposed upon him by citizenship and the desirability of his doing it honor. If you feel called upon to tell him of the poisonous political atmosphere, at the same time emphasize the fact that it will never be purer if good men hold themselves aloof from politics.

**Worthy of Respect.**— The boy should be made to see that farmers are as worthy of respect as men of any other vocation, and if he has ambition in other lines than farming he stands about as good a chance of succeeding as though he were of the city. Let him know Socrates was a farmer, and author of an immortal philosophy; that Burns could compose a poem while plowing; and in familiarizing him with the lives of Washington and Jefferson, do not forget they were farmers. Lastly, do not let your boys have occasion to describe their life with you as a Yankee once vividly described his. Said he:

"Father used to say, when I lived on the farm along with him: 'Sam,' says he, 'I vow I wish there was jist four hundred days in the year, for it's a plaguy sight too short for me. I can find as much work as all hands on us can do for three hundred and sixty-five days, and jist thirty-five days more if we had 'em. We hain't got a minit to spare; you must shell the corn and winner the grain at night, clean all up slick, or I guess we'll fall astarn, as sure as the Lord made Moses.' If he didn't keep us all at it, a drivin' away full chisel, the whole blessed time, it's a pity. There was no 'blowin' time' there, you may depend. We plowed all the fall for dear life; in winter we threshed, made and mended tools, went to market and mill, and got out our firewood and rails. As soon as frost was gone, came sowin' and plantin', weedin' and hoein'; then harvest and spreadin' compost; then gatherin' manure, fencin' and ditchin'; and then turn tu and fall plowin' ag'in. It all went round like a wheel without stoppin', and so fast, I guess you couldn't see the spokes, just one long everlastin' stroke from July to etarnity, without time to look back on the tracks."

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# SHALL I BUILD A SILO?

By L. H. ADAMS, Wisconsin Experiment Station, Madison, Wis.

**The Silo a Success in Wisconsin.**—Shall I build a silo? is a constantly recurring question, and one that every year's experience, with drouth and early frost, is intensifying and bringing out in greater numbers.

The system of preserving feed by means of the silo has been in practical operation in Wisconsin nearly ten years, and is, therefore, reaching an age which should enable it to speak for itself. Nearly every farming community in the southern part of the State now has a silo in or near it, which makes it possible for those who are considering the question of building, to study and familiarize themselves with the entire process, from that of filling to feeding

out, before undertaking the work, and they are, therefore, not called upon to exercise that degree of faith in the new departure that was required of the pioneers, who could do nothing but follow directions blindly.

**Some Causes of Failure.**—It is a significant fact that the men who have had the most experience in the construction and filling of silos speak favorably of them, while the objections come mainly from the persons who have never had anything to do with them. It is true that a great many made partial failure the first time they filled their silos, but in nearly every case it would be admitted that the difficulty was owing to faulty construction, or improper methods of harvesting and filling, and could be easily remedied the next time the silo was filled.

Experience has taught us how to improve the quality of our ensilage, by taking the corn at the proper stage of maturity, as well as the best manner of feeding, so that the objections urged against it in its early history—first, that it caused the animal fed upon it to scour, and, second, that it gave the milk from cows kept on ensilage a bad flavor—have been nearly, if not quite, overcome. It should be remembered that there is no single food that would give entire satisfaction if fed exclusively, and, therefore, the silo should not be held to account for our own ignorance of the proper use to make of it in order to obtain the best results.

**Value of Succulent Food.**—It is conceded by all intelligent and acknowledged authorities on cattle feeding, that one feed a day through the long winter months of some succulent food of the nature of roots is very desirable, if not absolutely necessary, to the proper assimilation of the mass of roughage and concentrated grain feed that is to be converted into beef and dairy products, and to maintain the health and spirits of the animal. For this purpose there is nothing that will compare with the silo for practicability or economy. This point of excellence is conceded to ensilage by writers who oppose the general adoption of the silo system on the ground of excessive cost; but the cost of this system of preserving feed is not excessive when all the advantages made possible by the silo are compared with the wasteful and unsatisfactory manner in which we are obliged, by force of circumstances, to handle air-dried fodder that has been put up in stacks, or, more likely, left shocked in the field. Some one may ask: "Why leave the shocks in the field; why not stack the fodder, or, better still, mow it away in the barn?" To which I answer that the latest and most comprehensive views taken of our greatest forage crop, and chief dependence—corn—will not allow of its being grown in the same manner, or harvested at the advanced stage of maturity, that is necessary to its successful preservation in large masses, either in stack or barn. Instead of growing a crop of corn at the same outlay of labor, for the ear alone, as formerly, we are coming to prize the stalk equally with the ear, and steadily acquiring better knowledge of the proper time to harvest, in order to combine the maximum nutriment in the ear and stalk.

**An Important Factor.**—There is another economical factor of great importance that is seldom credited to the silo where it properly belongs, and should always be considered in connection with the cost of filling the silo, and that is the reduced labor necessary to take care of a herd of cattle throughout the winter where the feeding is done from a silo that is conveniently located in or very near the stock barn. One man

will care for fifty head of cattle with less exertion and unpleasant experience with a silo near-by, than two men will the same number where it is necessary to haul the dry fodder in from the stack, or get it down from a distant mow and run it through a feed cutter. As it is impossible to keep a very large quantity of cut fodder in a mass, without its heating and becoming moldy, it is necessary that the work of cutting the stalks be done at intervals of two or three days throughout the entire winter. The consequent delay of hitching up and unhitching teams, bad weather and extra power required for cutting the dry as compared to green stalks, will carry the cost of cutting in the winter far beyond what it would be in the fall in the continous work of filling the silo, with fair weather and all necessary facilities at hand for rushing the work. If, then, we offset the expense of cutting the dry fodder in the winter with that of cutting the green corn into the silo, the comparative cost of the two systems of preserving feed turn on the losses of dry feeding matter that each have to sustain, or, to put it in another way, will the silo save enough feeding matter over the air-dried system to pay interest on the money invested in the building?

**Loss of Dry Feeding Matter.**—Taking the latest data obtained at the Wisconsin Experiment Station, by Prof. F. G. Short, on this subject, we find the average loss of dry feeding matter for a series of silos during the winter of 1888 and 89 was 15.94 per cent., while that of the same varieties of corn cut at the same time and given extra careful attention was 16.54 per cent., a difference of nearly one per cent. in favor of the silo, and it should be distinctly remembered that the air-dried fodder that gave these results received extraordinary treatment, and the fall was very favorable for preserving it nicely. It was allowed to stand in small shocks for a month after cutting, then lifted to the top floor of the barn, stood up carefully and examined frequently, to see that it did not heat or mold, which it was not allowed to do.

The ensilage, on the other hand, was preserved in silos 7×8 feet across and 14 feet deep. It will be readily seen that we had to contend with just as much loss in the four corners of these small silos as though the dimensions were three times as great, and, further, ensilage will not pack as readily in a very small silo as it will in a large one. It is plain, therefore, that while it would be a comparatively easy matter to duplicate the results we obtained with the silos, it would be extremely uncertain (and under the conditions that prevail on the average farm absolutely impossible) to preserve fodder in the dry state with as little loss as that found by the chemist at the Experiment Station.

**Silo Building Pays.**—I conclude, therefore, after ignoring the many other meritorious features of the silo, and assuming that properly-made ensilage is no better feed for stock in the winter than dry corn-stalks, that the mere saving of roughage and land necessary to keep a given number of animals will be sufficient to return a handsome interest on the money invested in the silo building.

**Directions for Building.**—I wish the reader to understand that the following directions for the building of silos are not offered as the best and only way of proceeding, but rather as one of the ways by which it can be done. It is not only unwise, but an actual hindrance to progress for any one to attempt to give definite and *fixed* directions, for we are constantly learning more and more, and have much yet to learn on the subject of

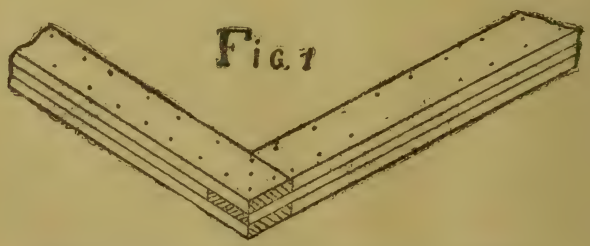
silos and ensilage that calls for modifications here and there in the details of construction and filling.

Location.— When possible the silo should be located in the feeding barn, since it not only brings the cost of building within the reach of everyone who is really in need of a silo, but greatly facilitates the handling of the ensilage when feeding it out. Depth in a silo is always preferable to breadth, so that in the case of basement barns it is advisable to let the silo reach from top of barn posts to the ground floor of the basement; a door or opening can then be made from the silo directly into the basement where the ensilage is to be fed. The next best location is adjoining the feeding stable. In most dairy stables the cows are stanchioned in two long rows facing each other, and, whenever it is possible, it should be arranged so that the silo can be entered from the end of this feeding alley; a wooden track can be laid along the center of the feed way and into the silo, upon which a low wheeled car can be operated to distribute the feed. If the silo building is located entirely separate, it should be planned to load the ensilage into a cart which can be driven into the feeding barn, thus delivering the ensilage with little labor directly to the cattle. The idea of convenience should not be lost sight of, for by exercising a little thought and judgment the labor of waiting on the stock through the long feeding season can be greatly reduced.

Form.—In a square silo less lumber is required, and less ensilage is exposed to the walls in proportion to the capacity, than in a long narrow building; it is the part of economy to retain as nearly the form of a cube as the location and other circumstances will admit. Theoretically a circular silo comes the nearest to perfection, for this form requires the minimum amount of material, and does away with the corners, in which there is always more or less decayed ensilage, but as we have had no experience with this form of building, nothing can be said about it at this time.

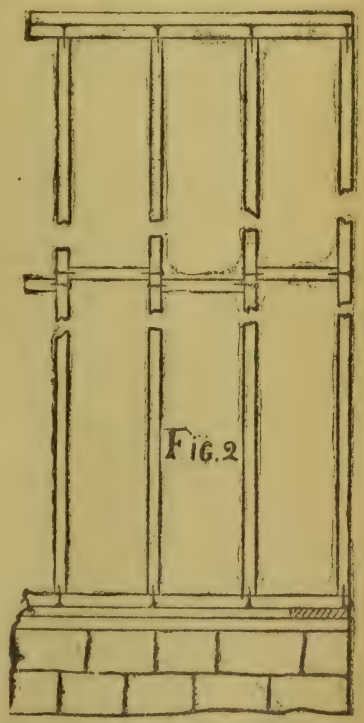
Building. — The following detailed description of how to build will apply to the outside silo, built separately or as an annex to the stock barn.

It is always the part of wisdom to provide substantial foundations for farm buildings that are intended to be permanent, and the silo is no exception. An eighteen inch stone wall should be laid deep enough in the ground to be beyond the action of frost, and raised high enough above the surface to admit of sufficient grading to divert all surface water; if the location be a high and well drained one, there will be no necessity for raising the wall more than six inches above the surface. In digging the trenches, throw enough earth inside to raise the silo floor up to the




SHOWING HOW PLANKS OF SILL ARE JOINED.

top of the stone wall. Upon this stone foundation a sill made of three 2×10 planks should be bedded in morter (see fig. 1). In laying the sill the top plank should not be fastened to the others, but left loose for reasons soon to appear. The studding should be 2×10 plank, preferably 18 feet long. After carefully sawing the studs to a uniform length and squaring both ends, arrange them in a horrizontal position, resting on the edges, and placed sixteen inches apart; they should be supported on a level with and at right angles to the sill upon which the bent is to be raised. Then spike the loose plank of the sill to the foot of the stud; and when all have been firmly fastened, as directed, they should be secured at the top in the same manner. After fastening the studding to sill and plate-planks, the side or end, as the case may be, is ready for raising. After the bent has been raised in a vertical position to its place on top of the other two planks of the sill, the third one that was nailed to the foot of the studding before the bent was raised can be firmly spiked to the lower ones. This first bent can be held in place by temporary stays until the remaining sills are raised; the plates can then be nailed at the corners, and the skeleton frame is complete; two 2×10 planks will give all the strength necessary for the plate. It will be observed that by following this plan the studs are securely fastened, top and bottom, and the full strength of sill and studding is saved, there being no mortises cut in the sill and no tenons on the studding. After the frame is up, the next thing to be done is to bridge the studding (see fig 2). This is a very simple thing to do, but of so much value in strengthening the walls that it ought never to be omitted in a silo. In case the silo is 18 feet deep, it would be advisable to put in two rows of bridging. By thus spiking planks between the studs, it makes it just as impossible for the studs in the center of the wall to spring out as it is for those nearest the corners. We are now ready to commence lining the silo. Each one can follow his choice as to the outside covering, since it plays an important part in the preservation of the ensilage; some will prefer to use drop-siding or ship-lap, others common lumber, and in some parts of the State it is possible to put on a covering of low-grade shingles cheaper than any other way. It is not necessary, for the preservation of the ensilage, that paper be used on the outside of studding, but to keep out the frost it is advisable to use it, since it




SHOWING FASTENING AND BRIDGING OF STUDDING.

makes the silo much warmer. Since a good deal of moisture rises from the ensilage, it is well to provide for ventilation at the roof. This can be done by openings in the gable ends of the building, or a dormer window in the roof. It is much better to carry off the moist air by ventilation than to have it congeal on the rafters during cold weather, and drop back again when mild days come.

Lining.—Care should be exercised in lining the silo. The lumber for this should have no knot holes, and should be dressed on one side, and is better if edged so that the joints will be reasonably tight. The lumber need not be of uniform width, but boards from eight to ten inches wide are preferable. The inside of the studding is first covered with boards, laid horizontally (see fig. 3), ten penny nails being used; building paper is then tacked over the whole surface. Upon the paper nail a second layer of boards. Care should be taken to break joints, which can be indicated by chalk marks on the paper. This double lining, with paper between, must reach from the top of the silo to the bottom of the sill.

The floor of the silo need be nothing but the earth. As already mentioned, it is a good plan to fill in the silo until the floor is on a level with the top of the stone wall; a layer of straw spread on the bottom before commencing to fill with corn will prevent the loss of any ensilage.

The silo should be tied across the top at two or three places with joists, or a cheap cable; this latter may be made by twisting three strands of galvanized wire which costs about three cents per pound; five pounds will make a cable sufficiently long to reach across an ordinary silo.

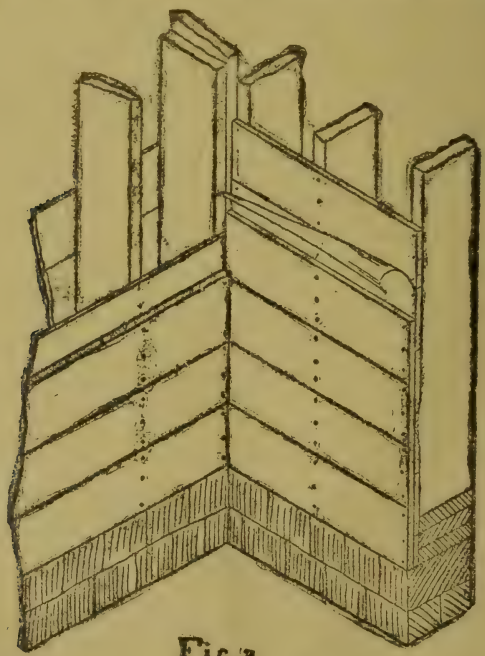


FIG. 3

SHOWING DOUBLE-BOARDING ON INSIDE OF SILO.

If the silo is more than thirty feet long the sills should be secured at two or three places with a cable of this kind, which, as it rests on the ground, is entirely out of the way. The modern silo will not tolerate partitions of any kind; they are relics of the past. There are several methods employed for cutting off the four corners of the silo. Perhaps the simplest plan is to bevel the two edges of a foot wide plank and nail it securely in a vertical position in the corner, and fill the space back of it carefully with sawdust or chaff closely packed. A dormer window in the roof of the silo affords a satisfactory means of getting the corn into the silo in the fall.

The doorway may be formed by cutting out a stud from the sill two-thirds of the way up to the plate. With large silos the doorway should be made sufficiently large to permit the entrance of a cart or some other vehicle for moving the ensilage from the silo to the cattle. There is no necessity for running the doorway to the top of the plate, since the ensilage always settles considerably, and even if it fills the silo above the top of the doorway there is little trouble in digging down just at that point and making an opening. Of the numerous doorways described, the simplest form is probably the best. Tack cleats on each of the studs which forms the sides of the doorway, so that boards six inches wide, running across the doorway come just flush with the inner lining of the silo. If the doorway is wide, set a stud in the middle to prevent the boards springing. Repeat the cleat and boards for the outside wall. During filling, as the ensilage accumulates, place a layer of paper across from cleat to cleat and tack on six inch boards until the doorway is closed; or it may be closed up at once when filling commences and the silo entered by a ladder reaching a doorway on top of the plate. In opening the silo the boards can be knocked off as the ensilage in fed down.

Paint the Inside Walls. — Now that the silo is built the question naturally arises, what is the best and cheapest wood preservative that can be applied to the parts of the silo that come in direct contact with the moist ensilage. An examination of one of the Station's silos that had been treated with a coat of coal-tar shows that one season's exposure to the ensilage had not affected the wood in any manner. The coal-tar possesses another great advantage over ordinary oil paints, there being so much body to it that it readily fills up all cracks in the lining, and aids greatly to make the silo air tight. It is one of the waste products in the manufacture of gas, and can ordinarily be obtained in any quantity at the gas works at three or four dollars a barrel. As it comes from the gas works it is a liquid of about the same consistency as molasses, and it is necessary to burn off considerable of the oil that it contains before it is in a condition to apply to a wall. This burning is a simple process: Pour a quantity of liquid into an iron kettle, set fire to a handful of straw and throw it into the kettle. The tar at once flashes up and burns with great heat. In order to tell when it has become sufficiently reduced, thrust a stick into the blazing kettle, then take it out and plunge it into a pail of cold water. When the tar clinging to the stick has become sufficiently cool to handle, take a particle in the hand and pull it out; if it will string out in fine threads a foot or more long, it has burned long enough, and the fire can be put out by placing any tight covering over the kettle. It usually takes from one-half to three-quarters of an hour to reduce the tar to the proper consistency. This prepara-

tion must be applied hot, and it will be necessary to swing the kettle up from the ground, and keep a fire under it until the work is done. The odor and smoke from the hot tar is very disagreeable, but by taking small quantities of the liquid and applying it very hot with mops or whitewash brushes, the surface can be gone over rapidly.

A single season's experience with a wood preservative cannot count for much, but we think very favorably of the method here described, and intend coating the walls of a large silo with coal tar the coming season for an additional test.

**Handling Fodder Corn.**—The cost of putting corn into the silo depends largely upon the advantage we take of all the little contrivances that are calculated to lighten and reduce the labor of harvesting and drawing to the silo By the use of the old self-rake reaper for cutting in the field, and conveniently equipped wagons for hauling, corn can be cut into the silo for from fifty to seventy-five cents per ton, and there will be no more hard work connected with it than there would be in harvesting a clover or grass crop. Many farms are supplied with low-wheeled wagons or trucks, but when silo-filling time comes there is usually a greater demand for vehicles of this kind than the ordinary farm can supply. A very simple and practical way of equipping the ordinary high-wheeled wagon is shown in fig. 4. This rack was observed in use on the farm of Hon. Hiram Smith, of Sheboygan Falls, in the fall of 1888. It is made of 2×8 plank, 16 feet long, one end of each being placed on top of the forward bolster; the other ends pass under the rear axle and are chained or bolted up tight to it. These two pieces make the foundation of the rack. The wagon is coupled out as far as these planks will allow.

On top of the plank are placed four cross pieces equally distant from each other, as shown in the figure. These cross pieces are 2×4 and should be about 7 feet long; upon these are laid inch boards parallel with the wagon. The load is, of course, placed wholly in front of the rear wheels, but the rack is sufficiently large, and low enough to enable a man to put on a ton of green corn from the ground without having to climb up on the load, or hand it to a second person to deposit.

**Length to Cut.**—While it is true that ensilage cut fine may pack somewhat closer than that cut long, it is doubtful whether there is any material gain in the operation; by cutting fine more of the inner parts of the stalks are exposed to the air, and perhaps more fermentation induced than with longer cuts. So far as our experience goes, there is nothing gained by cutting fodder fine instead of coarse, provided that the cattle eat it equally well in both cases; the gain in cutting, which is often

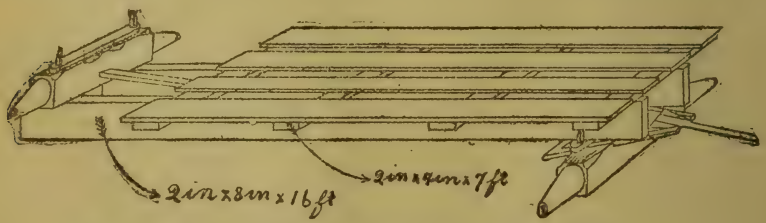



Fig. 4. RACK FOR DRAWING FODDER CORN.

very great, comes mainly from getting consumed that which would otherwise be wasted. In the case of ensilage, there being no necessity for cutting the fodder in order to have it eaten, the length of the cut appears to turn upon somewhat closer packing, on the one side, and extra expense of fine cutting on the other. It is recommended that cuts as long as two or three inches be tried with some of the fodder and the results reported; if such long cuts are satisfactory the expense of making ensilage will be considerably decreased. With ample power and a good feed cutter it will be more economical to cut fodder and run it into the silo by a carrier than to attempt to fill with long fodder.

**Use of a Chute.**—The carrier should deliver the cut corn as near the middle of the pit as possible. Until the silo is nearly filled a chute can be used to convey the ensilage still further toward the desired position in the pit. The chute should have sufficient slant so that the cut corn slides off readily. By changing the direction of the chute from time to time the labor of distributing the cut corn can be reduced to the minimum.

**Filling the Silo.**—When corn has reached the proper stage of maturity, it is not necessary that it be wilted before putting into the silo in order to make the so-called sweet ensilage; only the immature fodder needs wilting. Such should be wilted from 24 to 48 hours, if possible, before cutting into the silo. Varieties that mature, if left until the ears begin to glaze, can be put into the silo immediately after being cut, with satisfactory results, provided there is no outside moisture on the corn as it goes into the silo, nor is it necessary to suspend operations every day in order to let the ensilage in the silo reach a certain temperature before filling can be continued. If the corn is sufficiently mature, and is put into the silo without rain or dew, there need be no fear about the quality of the ensilage, whether put in slowly or rapidly. At the Station last fall we filled a pit with fresh, sufficiently matured corn in one day, and had first-class sweet ensilage. Recent experience has taught that there is a limit to putting dry or excessively wilted corn into the silo, beyond which we dare not go. When the corn has lost enough water to cause the leaves to rustle and break in handling, it does not pack closely enough in the silo to exclude the air, and, in opening the pit, it will be found that the ensilage is fire fanged and permeated all through with a white mold. There is another reason why the corn should not be allowed to become so dry, even if there was no trouble about its keeping in the silo; when we put dry corn into the silo we have lost the succulent feature of the ensilage that makes it especially desirable. Having once commenced to fill the silo the work can be crowded right along by observing the conditions mentioned.

The practice, each morning during filling, of removing the cold ensilage from along the walls and corners, and substituting that which is warm from the middle of the mass, seems a reasonable one and worthy of further trial. That it is not essential, however, to good sweet ensilage, our own experience has proved.

In the case of an accident or breakdown it will do no harm to suspend work for a day or two, but if left longer than this the ensilage, to a depth of two or three inches, usually begins to mold. When filling is completed a foot and one half of chaffed straw, marsh hay or cornstalks will make a sufficient covering. The use of weights is now about obsolete. The silo should be examined daily for a couple of weeks, and the cov-

ering pressed down until the settling has ceased.

**Two Crops in the Same Silo.**—The question is often asked if one crop can be placed on top of another in the silo, provided that the first has only partially filled it? Most certainly, if one crop, as clover, for example, only partly fills the silo. When the corn crop has matured, the covering of the clover can be removed or left on as desired and the other crop placed on top of it. By filling at different times much more can be got into the silo than if a single crop is placed therein by rapid filling. Even with the slow filling, ensilage settles considerably after the silo is closed up; with very rapid filling it may settle as much as two-fifths or one-half. Under any system it is well to allow two or three days settling at the last and filling up again so as to get in all the feed possible.

**Clover Ensilage.**—Too much cannot be said in favor of clover for the silo. There has been considerable hesitation about preserving clover in this way chiefly perhaps, on account of the extremely offensive ensilage which resulted from some of the first experiments in ensiloing clover. As in the case of the first corn ensilage, the clover was put into the silo in a watery and immature condition. The result was a watery ensilage of very offensive odor. By allowing the clover to become more mature, and cutting it when the dew is off, it is found that a bright, sweet, palatable ensilage can be made. One of the silos at the Station was filled in the summer of 1888. The clover was first growth, and owing to the drouth had become rather woody. The only precautions taken were to see that the dew was dried off before cutting, and that, in filling, the clover was evenly distributed, and well tramped down in the corners and along the sides. The silo was filled rapidly and immediately covered. On opening the silo the contents were found to be well preserved, with a slight aromatic odor, and but a trace of acidity. It was eagerly eaten by the cattle, and formed a valuable addition to their rations.

Profitable farming cannot be carried on without the help of this wonderful plant; we all know how difficult it is to cure into hay and get it just right, but by putting it in the silo the risk and expense of handling the crop is greatly reduced. Sunny days are not essential when putting clover into the silo. The mower can be started as soon as the dew has dried off in the morning, and by noon enough will be cut to keep two men with a team and wagon busy all the afternoon hauling the fresh cut clover and placing it in the silo. It is not necessary, in putting clover into the silo to run it through a cutting machine, so that the expense of filling a silo with this crop is very light. To those who appreciate the advantage of having a succulent food in the winter, and are willing to incur the expense of building a silo, but are restrained by the cost of the machinery necessary for reducing and elevating corn, we would say, build a silo and fill it with clover.

# HOW I BECAME A DAIRY FARMER.

By C. P. GOODRICH, Ft. Atkinson, Wis.

**The Key to Success.**—On looking about me, I discovered that of the great mass of those who were keeping cows the majority were keeping them for very small pay, and some at a positive loss, while a few were making a success of the business, and not only were enriching their farms but also filling their pockets. I noticed that the successful ones were the ones who had made the business a study; had learned all they could about it and attended strictly to all the minute details. No man need think of succeeding in keeping cows unless he is willing to give his attention to it, and care at least as much for the comfort of his cows as he does for his own comfort. He can't turn his cows out of the barn in the morning, go to town, and, because a snow-storm begins, stay there until night, awaiting for the storm to cease, and then when he gets home, cold and hungry, warm himself and eat his supper while his cows are shivering out-of-doors. If his conscience will let him do that he is no man for dairying.

**Seeking Information.**—Although I had milked cows and had the care of them, to some extent, since my boyhood, I found I was very ignorant on many of the most important points. I set myself the task of learning the business. I went to reading everything I could get on the subject, attended dairy conventions; talked with and learned much from those who were successful; obtained the results of experiments made by others, and experimented some myself. My progress was slow, but I kept learning. I improved my cows by care and selection in breeding, and by better feeding; I learned something of how to handle the milk and how to make and market butter.

At first the yearly earnings of my cows were but little more than the cost of their feed, leaving but little for the labor. But there was a gradual improvement each year, until now, after allowing a good price for the feed and labor, I have a good profit. Besides, *my land is growing richer all the time*, and I hope I am not done yet. I have not learned it all by a long way. I firmly believe that if I continue in the business I shall still further increase my profits. One thing is certain, that if I am to hold my own I must keep learning—must keep up with the times—or, in this age of progress, I shall be left behind.

**Some Things I Have Learned.**—First, as to the kind of cows we must have for the production of milk: We must have those that have been bred and reared for that purpose. Among our common cows—they are a mixture of many different breeds—we may find some good dairy animals, and with such to start with, one may, by careful breeding and raising the heifers from only the best cows, and by *feeding* for milk, and milking and handling in a way to stimulate the greatest production of rich milk, obtain a herd, in time, having a fixed character as milk producers. It will be found that the longer this course is pursued, if in the selection regard is only had for performance at the pail, the further the type will be from the beef type. But why not start out with some one of the mil-

breeds, that have been bred and used for generations exclusively for the production of milk, rather than spend a lifetime to create such a breed? Better by far to start at once with some animals of some one of the best milking breeds—Jerseys, Guernseys, Holsteins, or perhaps some other breed. I don't wish to advocate the claims of *any* particular breed, only that they must have a good milking record for generations back.

The General-Purpose Cow. — I used to believe somewhat in the general-purpose cow; believed it might be possible to raise such an animal, so many men said it was. I had graded up to some extent with Jerseys. They did well in giving milk but they were so small and scrawny, I did not feel satisfied. I did so like to see a good, large, smooth, square-built cow, that in an evil hour I determined to cross back to the Shorthorns to see if I could not produce larger and more beefy animals and still retain the milking qualities. I obtained an animal of what was said to be a remarkable milking family of that breed. The first year I raised seven heifer calves from my best cows. They were beauties, according to my idea then, and it would have taken a great deal of money to have bought them. I thought I had just struck it. Some of them came in before they were two years old. One of their calves I wished to make veal of, and it took two of the heifers to give milk enough to fatten him, and then he did not seem to have all he wanted. I fed them higher to try to stimulate them to give more milk, but it was of no use. After they had given milk two months I sold them for beef at $4.50 per hundred, and they weighed nearly 900 pounds each at just two years old. They had not given milk enough to prevent their laying on flesh fast. Well, they all, with one exception, turned out about the same, and they had to go.

I had another crop of heifers of the same kind that came in the next year, and they turned out about the same. There were just two out of both lots of heifers that proved worth keeping for milk, and they were both calves of a grade Jersey cow who seemed to have the power of stamping her progeny with her own qualities, both as to color and form and milk production. Now, this happened only four years ago and it has served to completely knock the general-purpose idea out of my head.

Feeding for Milk.—Whatever is produced by any animal comes from its food. It is plain that if we wish to produce milk, the food must contain all the component elements of milk, and to produce milk in the greatest possible quantity from a given animal, these elements must be in their just proportions and be fed in quantities up to the full capacity of the animal's digestion and milk-producing machinery. The chemist steps in now and, by analyzing different kinds of food, formulates a ration which, in his judgment, will produce the desired result. His work may be a great help to us by enabling us to experiment understandingly, but it takes practical experience to determine the correctness of his theories; for the appetite of the cow, her likes and dislikes, her ability to digest and assimilate certain kind of food in certain forms and under certain circumstances must all be determined by experiment. Another thing of the utmost importance to the dairyman is the relation of the cost of food to the value of the product. The proper elements of food must be obtained at the least possible cost in money and labor to make the business profitable.

Variety of Food.—I believe the cow herself to be a pretty good chemist, and

that nature will prompt her to select her proper food if she has opportunity. Therefore she should have as great a variety of food, both winter and summer, as possible. That she loves a variety could scarcely escape the notice of the most careless. If her pasture is all clover, except a little June grass, or prairie grass in the fence corners, see how closely the fence corners are gnawed down while the clover grows up tall and rank. If, on the other hand, her pasture contains but a small patch of clover, see how much closer that is fed down than the rest of the pasture. If, in winter, she is fed but for a short time exclusively on one kind of hay, no matter how good the quality, see how quickly she will leave it when offered some other kind — corn-fodder, or even straw,—and how greedily she will eat of the new kind of fodder, though its quality may not be of the best. Some otherwise sensible men signally fail in keeping cows, especially in winter, by not gratifying this very natural desire for variety. At pasture they have a better opportunity to obtain a variety.

Not long since I visited a farmer who keeps a large stock of cattle, some of them blooded stock, and he tries to farm it so as to make money. He casually remarked that he had fed no hay yet, although it was the last of December. He said he always fed his cornstalks first so as to get them out of the way before they were covered deep with snow. Next he fed his marsh hay, and when that was gone he fed his timothy hay. He liked to keep that till spring. He then remarked: "Somehow nuther I never could git nothin' like what you fellers tell o' gettin' out o' cows in winter, and still I've fed 'em lots o' corn-meal aready." I thought, "no wonder," but said nothing. (I forgot to mention that his blooded stock were Holsteins, some of which he paid $200 and over apiece for.)

**Proper Quantity to Feed.**—The next question to be considered after having determined the kinds of food to be given and how to provide the necessary variety, is to determine the *quantity* it is the most profitable to feed. In my opinion, it should be the greatest quantity the cow will consume and properly digest and assimilate. Of course great care should be exercised in feeding animals that have been under-fed. Increase the quantity gradually, and at no time over-feed so as to injure the cow's digestion, for that would be ruinous. The best way is to accustom her to generous feeding while young, and *never* starve her.

It takes a certain amount of food to sustain life. It is said this is about two-thirds of a full ration. By full ration I suppose is meant all that the cow can consume and digest. Now, if just this food of support is given a cow each day in a year, there can be no growth, no increase in flesh, in fact, nothing produced. So that at the end of the year all you have is the same size of carcass, only it is a year older, and all the food and labor is worse than thrown away. If this view is correct, we cannot avoid the conclusion that the greater the amount of proper food that is consumed and digested above the food of support, the greater the ratio of the product to the the whole amount of food consumed. You may say that all this is simply theory, but my own experience convinces me that it is a *correct* theory.

**My Dairy in 1875.**—The year 1875 was the first in which I kept any account of the proceeds of my dairy. That year my cows produced what was equal to about 150 lbs. of butter each, and the total proceeds were $38 each. I kept my cows about as others who called

themselves good farmers did. They had good pasture, and gave a good quantity of milk while the grass was fresh, but shrank badly in the fall and dried up early in winter. I fed good hay and corn fodder, but little grain in winter. The cost of feed I estimated for the year at about $25 each.

**My Dairy in 1876.**—The next year—1876—I fed better, feeding bran and grain during the fall and fore part of winter and early spring, and my cows produced 249 lbs. of butter each, and the total proceeds were $77 each. I had produced about 100 lbs. more of butter per cow, and the increased cost of feed was not more than $6 per cow. (Bran was cheap then.)

The next year I fed still better, with another increase in profits. I kept improving steadily, until now I intend to feed up to the full capacity of each cow; and I must say that, with every increase of feed, for every dollar laid out, I have got back *more than two dollars.* This, of course, would not be possible, if the cows were of the beef type and turned their food into flesh. In all my talk about high feeding I assume that the feed is to be given to a true dairy animal that will make it into rich milk.

**The Way I Feed**—My cows now is to let them have good pasture in summer, with a variety of grasses. At all times they have free access to good, pure water, which is warmed in winter. They have all the salt they want.

When they are put into milk, there is in the mangers some good early-cut-hay, of which they always eat a little, even when grass is the best. After milking they are fed bran. In the fall they have fodder-corn besides the other feed. During the winter they have all the clover hay (with sometimes meadow hay or millet), all the cut corn fodder and all the straw they will eat, with from 10 to 15 pounds of bran and meal per day. I drop off nearly all the grain ration about two months before calving, as I have found by continuing it too long there is more danger of milk fever. I think as good a grain ration as I can get, is one-half the weight wheat bran, ¼ oats, ground, and ¼ corn-meal; but if oats and corn are much higher than bran, they can be left out, and the whole weight be of bran, and be nearly if not quite as good.

**Increasing the Capacity for Milk.**—I do not wish to be understood as claiming that a cow can be brought up from 150 lbs. a year to 350 lbs. immediately as the result of better feeding. The improvement will be gradual, taking some years to reach the highest limit. Nor do I claim that the result in my case is *wholly* to be attributed to better feeding, though mainly so. Better handling and selection in breeding have done something toward the improvement. What I do claim is this—that the capacity of a cow for giving milk can, by the right kind of feeding and handling, be increased both as to quantity and richness in butter fat, from year to year, until she is at least 8 years old, and that a family or breed of cows, by the same means, can be so improved in this respect that each generation will be better than the preceding one, even without the introduction of any better blood. In other words, I will say that the more and the richer milk you manage to make a cow give, the more and richer milk she *can* give, as you develop the capacity to do so, and she will transmit these qualities, in some measure, to her progeny. Animal nature has the power to gradually adapt itself to its surroundings, and to the uses to which it is put.

**"Run-Out" Cows.**—As good care and

feeding will improve any breed, so starving and hard fare will cause the best breed in the world to degenerate. How often do we hear it said that the stock of certain men has "run out." A cow that has always been poorly fed, and is descended from poorly fed ancestors can not possibly be a good cow. Her ability to withstand hard fare may have been developed so that you may call her hardy, but it is at the expense of her milking qualities. Now, I don't want hardy cows in the sense that is generally understood.

**The Nervous Theory.**—A good dairy cow is a wonderfully delicate and sensitive piece of animal machinery. The brain and nervous system are so intimately connected with the milk-giving functions that whatever excites the nerves through the brain affects the milk, usually—but not always—lessening the quantity of milk, but *always* diminishing the per cent. of butter fat to a greater or less extent, according to the degree of excitement. This being the case, it is necessary that a cow to do her best must be *just as contented and happy* as it is possible to make her. She must not be exposed to storms or inclement weather, or any conditions that will give her discomfort or pain. She must have no anxiety in regard to food or drink, which should be given at regular times and in quantity and kind to suit her appetite and needs.

**The Milking.**—This I consider the most important operation in dairying. It should be done by the same person, in the same manner, and under the same circumstances every time. I care not whether you feed before, at the same time, or after you milk, if you do the same every time. I care not whether you take hold with the whole hand or strip with thumb and finger, or milk one side together, or milk diagonally, so long as you do it in a way that will quickly get *all* the milk, and in a way that *best pleases the cow*, and so long as you do the same way every time. If there are several cows they must be milked in the same order every time. If you are in the habit of beginning at one end of the line and going through in regular order you will notice frequently, if the cows are giving a full flow of milk, about the time you get done with the first one the milk will begin to drop from the second one. She is then ready to be milked—expects to be milked. Do not disappoint her by going to the other end of the line. If you do so, and come back to her after half an hour, you will find that she will not "give down" as readily, and that you will very likely get less and poorer milk than if you had milked when her turn should have come.

You may sing or whistle while milking if you like, if you do the same every time. You may sing different tunes if you wish, but sing the same tune to each cow every time. If you sing "old hundred" to the "Yankee doodle" cow, your hands, which will be likely to keep time with the tune, will have a slower motion, your milking will be different, the cow not so well pleased and the yield of milk poorer.

**Effects of Excitement.**—Now, I know that some of you are saying to yourselves that you don't believe a word of such stuff, that it is all nonsense. Others are saying, "there may be something in what has been said, but this is getting down too fine." But you all know that it is the *fine* workman in any business who makes the most money and commands the highest wages; not the rough, coarse workman.

Every one who has been in the habit of testing the milk of cows has found an unaccountable variation from day to day in the per cent. of butter fat in the milk

of the same cow, and also that the butter churned from the milk of a herd of cows varies almost daily. In my opinion, these otherwise unaccountable variations are mainly caused by some worry or nervous excitement of the cows.

Now, this is not a theory that I have adopted *first* and then set to work to hunt up facts to prove it afterward. The *facts* came to knowledge first, and I have labored patiently to find the cause. I believe if *great* excitement will produce very marked effects, less excitement will produce similar effects, only in a less degree, on the principle that if two drinks will make a man drunk one drink will make him half drunk.

A few months ago I bought a seven-eighths Jersey cow of a man who said she gave remarkably rich milk. She was the only cow he had, and was well fed, so he had a chance to know. The next day after getting her home I tested her. It took 23 lbs. of milk to make a pound of butter. Two weeks after, when she had become well contented in her new home, I tested her again and it took but 11½ lbs. of milk to make one of butter. There had been but a slight variation in the daily quantity of milk.

Two years ago I had a fine cow that become, one day, terribly excited; in fact she was in a perfect frenzy. The next day it took 40 lbs. of her milk (she was giving 40 lbs. a day) to make a pound of butter. Before that and three days after that, when she was perfectly quiet, it took but 14 lbs. of milk to one of butter. These were cows of a highly nervous organization. I could give many more similar instances, though not all of them so pronounced, but these will do.

Now, these are some of the facts in relation to this subject that have come under my own observation, and they mean something — they mean that the man who is kind and gentle with his cows and careful of their comfort will get well paid for it, and the man who is harsh and rough and cruel with his cows will find his profits small indeed. It is very costly having cows brought from pasture on the run with a dog at their heels. The angry milker who mauls a cow with his stool and raises a general excitement in the stable is knocking, it may be, a dollar out of the owner's pocket with every blow he strikes. You may not fully accept this nervous theory, but if what I have said will cause any man to think, observe and investigate in relation to it, I shall be satisfied, for he will learn some things by which he may profit immensely.

# SUCCESSFUL CORN CULTURE.

By O. STRAHL, River Falls, Wis.

**A National Crop.**—Corn is our national crop; it is king. Its acreage is about 55 per cent. of all the cereals, and in quantity it is four or five times that of wheat, averaging over sixteen hundred millions bushels for eight years past, and supposed to foot up to two thousand millions this year—a quantity so enormous that it would take 80,000,000 of teams at 50 bushels each, before shelling, to draw it, and which, on the road in a string, one to every two rods, would reach 500,000 miles, to the moon and back and once around the earth.

**Yield.**—The yield is much greater per acre in the northern States than in the southern. Ohio, Indiana, Illinois, Iowa, Wisconsin, Missouri, Kansas and Nebraska average about 26 bushels per acre, usually, while Alabama, Georgia, the Virginias and Carolinas, range all the way from 11 to 18 bushels. It is not an important crop in Europe; the United States produces three-fourths of all the corn in the world.

**Climate.**—Our climate here in Wisconsin, although quite well up north, is well suited to producing good crops; usually just enough heat and moisture to mature middling-sized corn in the highest degree of perfection.

**Success in Raising.**—In corn raising, success depends largely in getting good ready. We must lay plans and calculate beforehand; we must commence away back last year and save the seed out of that crop, long before any preparation of the soil begins—say about the first week in September. Just as it begins to dent, and some of the outer husks indicate ripeness, is the best time to select, for we want those ears that ripen first, other things being to suit us; we want good stock, as in animals; we want a good breed of corn, to suit the climate. It must be vigorous and hardy, rather low and stubbed, with one good ear rather low down. Two or more ears are a failure; neither one is apt to be good. We select the kind of corn as to character of grain, cob, etc., that suits us; deep grained dent corn is my choice. I have the yellow deep grained Hackberry and the Powell Illinois white corn; the yellow is the earlier and yields about as much per acre. It is not quite so large but will bear to stand a little thicker.

**Saving for Seed.**—To ascertain my preference, I counted out representative ears of both varieties, weighed each, and shelled it, weighed cob and shelled corn, and found but little difference as to amount of cob and corn—about a half pound in a hundred in favor of the yellow; but I found a great deal more moisture in the white corn than outside appearances indicated, fully establishing the fact that the yellow is a week or more the earlier.

The seed gathered early is full of juice or sap, and must be dried out thoroughly, cob and all, before it freezes. To do this I tie it in bunches with twine or wire, ten or twelve ears together, and hang as near the kitchen stove-pipe as my wife will let me. If kept a little warm, in two or three weeks it will do to put away and, if thoroughly dry, freez-

ing will not hurt it. It may be shelled if it suits one best to take care of it in that way. It is all right now, and we can warrant it, as nothing but downright neglect will thwart its energy; next year's crop is there in embyro, snug and sure.

Preparing the Ground—Plowing.—Now, then, we will get the ground in order. Either fall or spring plowing will do, as it may suit our convenience. The fall plowed land may become packed and hard by numerous storms; if so, it must be mellowed before planting by re-plowing, the use of the disc or spring tooth harrow, or something that will make it absolutely mellow, or else it will be mere chance if we get a good crop, for it is scarcely possible to thoroughly pulverize the soil after the seed is in without disturbing it.

Weeds do not seem to start quite so quickly and saucily on fall plowing unless re-plowed in the spring. Then look out, and hurry up, too, for of all the unwelcome guests of the young corn the early weed is the worst. It seems as if weed seeds after lying under ground for six months or a year, or it may be several years, being turned up to the surface, envy their neighbors who have had a better chance to grow and pester us, and start on in two-forty haste to make up for being kept under so long. Well, if a stich in time saves nine, a lick in a corn-field addicted to weeds saves 99 or the whole.

Any of our soils here will bring first-rate corn. We have quite a variety, too—sandy loam and absolute clay often on the same quarter section, and the wise farmer, in his course of rotation, handles one and the other to suit the dictates of good judgment. Therefore, we cannot write down a rule that would suit for the handling of all these various soils in their several conditions. Some are thin and some are deep. We must be careful and not turn up much of the cold sub-soil in plowing, or it will injure the crops. Deep loam, porous away down, will bear deep plowing—up to the beam if the team don't object—but this land is good for a pretty fair crop with half a chance.

I would plow on my farm, which is between real loam and real clay, with clay sub-soil seven or eight inches, for spring work, when the ground is liable to be wetish; would be very careful to have it dry enough to work well and not pack under the horses' feet or against the mold-boards, or it will be cloddy, and clods give out no nutriment; consequently such amount of the soil as these clods contain is a dead loss until time or storm, or mechanical contrivances, dissolve them, which may not occur until late in the summer—after it is too late to benefit the crop. Therefore, we should handle our ground carefully so as not to make clods.

Early planting, is surest, say from the 5th to the 12th of May.

Planting.—Having worked diligently with plow, harrows, rollers and such implements as the occasion demands, we will mark the ground both ways, especially if there is danger of weeds, about three feet eight inches, and plant with the hand planter, probably four to five kernels in a hill, so as to be pretty sure of a stand of three stalks, on the average. Kernels of corn vary so in size, even in the same variety, that it is not possible to get a machine to do it as nicely as counting, but the machine-planted, if carefully done, comes up more surely and has a firmer foothold. At first, to withstand tough handling in case of harrowing, we should try to do

the planting in two days or less, so as to have an even start all over the piece.

Harrowing.—As we only left the slanting fine-tooth harrow when we had to, to mark the ground for the planter, we will put the team right to it again and go over it once each way, and repeat one way in a week or so, or just as the corn comes up. Then it must be harrowed once or twice more by the time it is up four or five inches. After this the fine-tooth single cultivator should do the work, running as close to the corn as can be without pulling it out, and very shallow, two inches or less. About four times with this cultivator at intervals of eight or ten days will put it up to the period of the tassel beginning to make its appearance, when it will be time to cease, and let it take care of itself. Bad weather may prevent the carrying out of this plan punctually.

Stirring the Soil.—If the season is dry, the oftener we stir the top soil so as to keep it loose and porous the more moisture it will receive by capillary attraction from the sub-soil and atmosphere and thus render more nourishment to the crop. We must also stir the ground as soon as it will do after every heavy rain, to prevent the formation of a crust on top.

I do not believe in cutting and breaking the roots. I think it injures corn or any plant to cut and mutilate its roots, especially in dry, hot weather, so as to make the plant wilt and show signs of being crippled.

When I was a boy this deep stirring of the soil was thought to be the thing for dry, hot weather, but it looks to me now a little akin to cruelty to mutilate a plant and make it sick at the time when the recuperative resources of nature are temporarily withheld. I therefore say do your deep work before planting. Shallow culture and lots of it is safety.

Smut.—Some think that wet weather induces smut, but we read of frequent instances of its prevalence in dry seasons, at any rate it does not originate spontaneously but from seed or spores, as they are called. These spores are very light, even lighter than common dust, and thus float about in the air and light, and grow, retaining all the time, like the chinch bug, wonderful vitality. Barnyard manure, where infected fodder has been fed out, is a good medium for keeping the supply up, for even though it be eaten it will pass through animals, and retain its vitality. The remedy here, now, where it has but a slight hold on corn might be found in going through the corn before it gets dry and light enough to float off in the air, cut it off and collect and burn it; this would be practicable now, but not very effective without joint action all around the neighborhood. This smut is evidently on the gain, and may develop into a formidable injury. Let us beware.

# IMPORTANCE OF SHEEP ON THE FARM.

By S A. PELTON, Reedsburg, Wis.

**Getting out of Sheep.**—The census of 1885 gives Sauk County 37,680 sheep and lambs, or 1 7-10 to a person, at a valuation of $1.54 per head. Wisconsin has 1,429,137 sheep, or less than one sheep to a person, at a valuation of $1.64 per head. This surely is not an over-production for the county or State; but, nevertheless, there was a general outcry all along the line that sheep did not pay. The city papers took up the cry, and flock after flock was sold in Chicago, and the proceeds used to purchase Minneapolis bran and shorts, to fatten pork and beef at a far greater loss than was imagined to have been real in the first transaction.

**The Branch of Farming to Pursue.**—The farmers of Sauk County are engaged in mixed husbandry, and some are so badly mixed that they cannot tell which branch pays the best; but, judging from the experience of the past, that branch which for a term of years has yielded a fair profit above the general outlay is the one to hold fast to.

It is not absolutely necessary for a farmer to ape the methods of his neighbors. Location, soil, and liking for the occupation should, in a measure, determine his drift. No special scientific education is an absolute guarantee of success in any line of farming. "Where there's a will there's a way," "business experience is an apt teacher," are maxims that will apply with full force in practice. I would not advise any one to quit dairying, fattening beef, pork, or breeding horses, when one has buildings and apparatus necessary to produce the requisite results. Occasionally changes must be made, but would it not be better to change methods than to change the line of farming?

**Sheep on Rough Land.**—If a person has a rough and broken farm, and small capital, he can hardly strike a better opportunity than to secure a few sheep. They will be a nucleus around which will gather, under good management, a large flock in a short time; an investment that will pay interest at shearing time at the rate of 100 per cent., and dividends from each lamb, besides leaving the pasture lot fertilized in the best possible manner for a crop of winter wheat.

**Mutton the First Consideration.**—Mutton first and wool second should be the aim of every flockmaster. While opinions differ as to breed, the farmer can illy afford not to heed the fact that the market demands that certain conditions be fulfilled. Feed influences breed to a great extent, and care likewise leaves its ear-marks unmistakably prominent in every flock.

**Yarding.**—Many farmers have lost the increase of their flock by yarding sheep, horses, cattle and hogs together. Lambs do not thrive well with hogs, nor do sheep come up to the standard of expectation when trampled on by horses, or hooked by cattle. I would not advise any one to turn a flock of sheep and lambs into a field in spring and leave them there until fall. The chances are that none will be found when the owner calls for them.

**Farming Requires Thought.**—Farming is a business that requires thought and forethought to manage skillfully the many problems that constantly arise as to the best methods of improving the fertility of our soils, and at the same time leave us a fair and living profit. It is an important consideration to keep stock that is best adapted to your peculiar conditions. When help is scarce, sheep offer opportunities to relieve one of a large amount of labor that is required in the proper management of the dairy and its kindred associations.

**Mixed Husbandry.**—Much has been said about special farming by the agricultural press, and by specialists, but often they neglect to inform the public that their start in business was peculiarly favored by various circumstances. I believe in mixed husbandry for the farmers of Sauk County. I also believe that the specialist has his place, and further, that no one method of farming followed for a great length of time is sure of the fullest success unless the power behind the throne makes it a success.

**The Hand at the Helm.**—Sheep husbandry, like any other industry, must have the right hand at the helm to make it profitable. One must have a liking for it and make it a study. Blood will tell, and feed will tell. One person may take a flock of sheep and make them pay, while another may lose by the operation. The shortest rule in application is to breed well, feed well and then sell well. There is profit in so doing; there is loss in the reverse.

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# CHICKENS FROM SHELL TO GRIDDLE.

By W. H. ROSE, Boscobel, Wis.

**Care of Fowls and Eggs.**—If we depend on raising our own fowls, we must first get the eggs, and in order to get them we must first provide ourselves with the variety of fowls that are best adapted to egg production; then care for, and feed the proper food to enable the fowls to lay the eggs. If it be in the winter season, when the fowls are shut up all the time, great pains must be taken in gathering the eggs before they are chilled; also in giving the fowls some kind of green food, because eighty out of every one hundred eggs will fail to hatch when the hens are confined and no green food is provided. Right here is where a great many living in villages fail. Even in the summer season they are obliged to shut up their hens to keep them out of their neighbors' gardens, and they either forget or neglect to throw them something green each day, and the consequences are lousy hens and infertile eggs.

**Feeding the Chicks.**—We find by careful study of the subject that the egg is composed largely of albumen and there is scarcely any albumen in corn, but a large per cent. in wheat. It lies just inside the outer skin of the wheat; consequently wheat bran is one of the best foods to produce eggs. Feed it hot

and wet, feed it dry—any way the chicks like it best. Oats are good; small, shrunken wheat is good and buckwheat is splendid. My plan of feeding is this: Take boiling water, add a little salt, a little cayenne pepper and a little sulphur; then stir in some ground feed, making a kind of mash, and add wheat bran until the mass will crumble and not be sticky. By the time you have stirred this up it will not be too hot and will be greatly relished. This makes a good breakfast and should always be fed early and in V-shaped troughs. For dinner I scatter a little shrunken wheat or screenings among the litter (previously provided) and let them hunt for it. If it occupies their time for three hours all the better. Exercise creates warmth and warmth means eggs, especially in the winter season, and that is when we want them. For supper a full feed of corn or wheat should be given just before they go to roost.

Make Hens Lay.—Some people suspose and even claim that if hens lay in the winter season they will lay less in the summer, or, in other words, that they will lay only just so many eggs in a year. It is a mistake. The hen is an educated being. In her native state she laid nine, eleven or thirteen eggs, became broody, sat upon them, hatched out a portion of them and then guarded the chicks for six months. Now we have hens laying 185 eggs in a year and rearing a brood of chickens besides. True, a hen will lay only a certain number of eggs and then become broody, but she can easily be broken up and made to commence laying again. Thus by a little study and care she can be made to contribute her share toward filling the egg basket three-fourths of the year. Of course, she must moult, and no power that I know of will induce her to lay any eggs during that period. It takes all her vitality to produce the new crop of feathers. Hens begin to shed their feathers early in the fall and don't complete their plumage until about December 1st. You will readily see that if a hen lays no eggs in the winter, and does not begin before the middle of April, she has no time to lay her 185 eggs, laying usually one egg every other day. The fact is the hen is simply an egg machine, and if fed the proper food, and carefuly cared for, she must either lay or die. Many of the wild birds lay an even number of egg—two, four or six—before if unmolested, they will become broody and set upon them. If you remove one of them, they will lay one more before beginning their incubation process, showing conclusively that all birds may be compelled to lay more eggs than nature intended they should.

Eggs for Hatching.—Remove all the eggs from the nest every day. They will hatch very well when three weeks old. This will prevent their becoming broken, or chilled by frost, and the hen will think every day she goes to the nest that she has just begun to lay her usual thirteen to fifteen eggs, and never knows when she is through. Eggs intended for hatching purposes should be kept where there is an even temperature and turned over every day. They will hatch very well when three weeks old.

Hatching Chicks.—To hatch chicks successfully you must have a place to set the hens in separate from the flock. Have it large enough to accomodate as many hens as you wish to set; make the nests large and smooth, on or near the ground. If possible, set three or four hens at a time, giving each hen nine, eleven or thirteen eggs, acccording to the size of the hen. When one week has elapsed go in the evening armed with an egg tester and a lantern; examine every egg, throw out the infertile ones and

give the fertile ones to one, two or three hens, as required to cover them, and supply the others with fresh eggs. Thus you may hatch with four hens as many chicks as you would ordinarily with eight. When broody hens are scarce (and that is the case generally in the winter), I sometimes compel them to set six weeks. Keep the setting hens quiet. Arrange so that whenever they come off their nests they may find a drink and a good square meal handy. If two or three come off at once, and on going back should make a mistake and get into the wrong pew it will make no difference. When they settle down to business they will make no mistakes, and then is the time you should give them the eggs you wish them to hatch. It is always well to give them some china or poor eggs to set on until all is quiet. It is often the case where biddy is too attentive to business, and sets on her eggs too long at a time, that the eggs are spoiled; or, in other words, the embryo chicks are killed. Watch her, and if she does not come off at least every other day, gently take her off long enough for the eggs to cool. If any of the eggs get broken there is no time to lose. Take some milk-warm water and wash them carefully, for if any of the broken ones should smear the good ones, it will effectually close the pores and the chicks will die. They must breathe the same as any other animal. From the 19th to the 21st day you may expect some of the little chicks to break the shells, and if you have sprinkled the eggs two or three times in the last week with slightly warmed water they will break them all the more readily. The better work the little fellow makes in getting out of his prison cell the better are his chances for life. If he pecks a crease clear around the shell and comes out spry his chances are good, but if he simply pecks a small hole in one side of the shell and begins to peep until you remove the shell, the chances are he won't live a week. Well, better dead than alive, for who ever saw a sickly little chicken get well and grow?

Care of Young Chicks.—When the first to hatch are twenty-four hours old remove them to some dry place. Take one of the hens along and give her all she can hover conveniently. The more you give her the prouder she will feel. Perhaps twenty is about right for an ordinary-sized hen. Place the remainder of the eggs under the other hens, and as fast as there are enough for a brood take them out and so on until they are all hatched. Remember always that the little chick needs absolutely nothing to eat or drink for the first twenty-four hours of its life. After this feed very sparingly of something light. Perhaps the very best thing to feed for the first week is hard boiled eggs, chopped fine, shell and all, and the infertile ones we threw out two weeks ago are just as good for this purpose as fresh ones. Bread crumbs and crackers soaked in milk are also very good for the little chicks. In a few days small seeds, shrunken wheat, etc., are good. Sour milk, or clabber, as we call it, is splendid. In order to give some sulphur, salt, pepper, etc., we prefer to feed one feed a day of soft food. Always have your water boiling that you mix the feed with. After the long fast of the night, the chick needs something that he will not be obliged to wait for the gastric juice to moisten, and the gizzard to grind, before he can feel the effect of it, and for the same reason some whole grain is good to feed at night for the organs to work on. Furnish the hen with plenty of whole corn while hovering the chicks so that she will not be too greedy and eat up all the dainties you may place before her for her chicks. Shallow dishes are best for the little fellows to

drink from, and they should be often filled with fresh water. While caring for and feeding always keep in mind that all that goes to promote size, plumage, bone, sinew and muscle must go down the little fellows' throats. Keep them growing; much depends on their growth. At six weeks' old chicks of some of the varieties will be large enough for broilers, and if it is in March they will be worth, in any of the large cities, seventy-five cents apiece.

Young growing chicks need good ventilation. Impure air is destructive in more ways than one. They become lousy, scaly leg overtakes them, and they generally begin to droop and fall behind the flock. They huddle close together at night and the droppings soon become filthy and cause disease. To guard against it, keep everything clean. Feed in small V-shaped troughs, and never on the ground. Keep "Douglas" mixture in their drinking water, and never feed more than they will eat up clean. Give them a varied diet of anything they like, except raw corn meal dough.

You will readily see by what I have written that the poultry business is made up of little things, minute in themselves but large in the aggregate.

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# THE BUSINESS FARMER.

By J. H. HALE, South Glastonbury, Conn.

**Figure the Expense.**—I start with the supposition that every farmer has a farm either owned in his own right, partially mortgaged, or leased—in fact, an investment of capital on which dividends must be earned and paid, either in interest on investment, or borrowed capital, or in the payment of rent—before he can receive any compensation for his labor. The business farmer will, before beginning operations on his farm, do just as every other business man has to do, if he is to make a success of his business, carefully figure how much will be required annually to pay this, with cost of labor, taxes, wear and tear on implements, ordinary repairs, etc., and thus ascertain just how much the farm must produce in cash returns, before he can receive any compensation in the way of profits.

**The Crops Best Produced.**—Having found this, it becomes his duty to know just what can be produced, to the best advantage, on his particular farm, and what line of work best suits his tastes and circumstances; last but not least what markets are to be supplied, and how he is to reach them. In fact, these two last points should be settled before purchase or lease of the farm. However, if that question is already settled, he must put time and thought to the study of the situation.

**Brain Work on the Farm.**—Don't pitch into heavy, hard work with the idea that in this way you are to make a success of farming. The business farmer, whether his capital be one hundred, one thousand or ten thousand dollars, in every case, is not so much a worker with his hands as with his brain, studying

and planning all his operations before putting them into practice. He has no more brain than the rest of us, but gets ahead by using his while we unthinkingly dig and delve day after day without method, grumbling that "farmin' don't pay," and that "ours is a hard lot." The fact is farming is the best and safest business of all. Were it not so, the slipshod, unsystematic methods many of us have followed in the past would have brought ruin long ago.

**Habits of the Business Farmer.**—The business farmer is a successful farmer, and always will be, if we are to judge the future by the past. He is a student, not of books alone, but of good agricultural papers; of experiment stations and their work; of the work of other farmers, successful and unsuccessful. He is also a close student of the markets for the purchase of his supplies as well as the sale of his products. He may not be a thorough book-keeper, yet he keeps an account with the various fields and crops; knows the cost of each product of the farm, and is as prompt to drop those that do not pay as he is to try something new, that his judgment tells him promises good returns. In fact he is a brain worker rather than a common field hand. He knows that so far as brute strength is concerned, he must take off his hat to the old horse or the little brown mule, and he gladly does it, and cooly rests his brain that he may better direct their work, and thus reap greater profits from the farm.

His leisure time in the winter is not spent at the village store, or in talking politics at the railroad station, or on the street corners, but at home planning for future work.

As soon as the year's operations close in the fall, he is making plans for the coming year. Long before spring opens he knows just what is to be planted on each field; where the seed, labor and manure is to come from. Every implement is in order, and enough extra repairs are ready at hand so that no time need be wasted during the hurrying days of seed time. The business farmer has learned that his farm is only a sort of manufactory, which, to be made profitable, must be run to produce that which the forges, looms and spindles of the soil are best adapted to; and that the finished product will depend almost wholly upon his starting operations promptly on time with a full supply of raw material in the shape of seeds, plant food and well-directed labor.

**A Standard for Goods.**—When the finished product is turned out, he knows that he must establish a standard for it in the market, and then maintain that standard, if he is to hold his customers and obtain satisfactory prices. One great trouble with us farmers is that we lack a standard for our goods. Ask any ten farmers to bring you a barrel of No. 1 apples or potatoes of a specified variety, and the chances are that you will get ten different grades of goods, the assorting having been made according to the judgment or honesty of each. Consequently "farmers' packings" in any line are almost always quoted at lowest rates in most markets, and it is often risky buying them at any price.

**Packing Goods.**—Farmers often get the credit of dishonest practices in packing and disposing of their goods, when no dishonesty was intended, the whole trouble coming from ignorance of business methods, and the requirements of the markets. It is the business of the farmer to know and understand this, and then conduct his affairs on a business basis. Reward will surely come. A business name and reputation is as valuable on the farm as in any other

profession. I will cite a few cases in point:

Some time ago I was in a market town, and saw a car-load of apples unloaded, all in second-hand barrels, some round and some flat hoops. On the heads were stencilled the names of the former contents, "crackers, flour" etc. of a dozen different brands. On these were tacked plain, white cards with the name of the variety which each barrel contained, written with a pencil, and marked No. 1. A few were opened and found to be large, bright apples but had no uniformity in grading, and they sold at from $1.25 to $1.50 per barrel. Another car-load from a business farmer was in nice new barrels, on the heads of which were plainly stencilled the name of the grower, with postoffice address, the name of the variety, followed by the words, *warranted* extra No. 1, or No. 2. An examination showed no better fruit than the first lot, but instead of being all mixed up and marked No. 1, they were nicely graded, as indicated by the outside marks. The average price obtained for the whole car was $1.80 per barrel, or an average of 50c. more than the first named lot sold for, or more than twenty-five per cent. actual profit to the business farmer, who knew enough to pack his goods, guarantee them and put his name thereto.

**Business Methods in Dairying.**—A friend of mine who is producing milk for the wholesale market, from a herd of ordinary grade cows, takes the trouble to weigh the feed of each animal and the milk daily. By a careful study of this record he is able to know just how much grain ration he can afford to feed each cow; also just when an animal becomes unprofitable, and so dispose of her, replacing by one giving better returns. I might as well own up that his neighbors call him fussy, but the fact remains that while they are complaining that there is no profit in making milk at present prices, he has a pleasant, happy home, with all the comforts and many of the luxuries of life, is yearly adding to his bank account, and the old farm is improved in productive capacity, for he is a business man, devoting, as he does, the best thought to his special line of work, and not unthinkingly drifting along, and then grumbling that there are no profits to be obtained in agricultural pursuits.

**In Fruit Raising.**—On South Water Street, Chicago, some years ago, I saw red raspberries selling for twelve cents per quart, from a number of different growers from Southern Illinois. One lot, carefully branded on the outside, the dealer asked sixteen cents for, and refused to open. "That name," said he, pointing to the stencil mark, "is a guarantee that they are all right. He is a thorough business man. We and our customers know they will prove to be just as represented."

Following up this lead, I visited the grower at the farm, and found, as I expected, a business farmer. He had learned that for firm fruit his berries must have sunlight and air while growing; hence they were not planted as thickly as was the custom of his neighbors. He had also learned that certain kinds of plant food effected the texture and quality of the fruit, and by a lot of plat experiments learned what to use and what not to use, to give him bright colored and solid fruit; also that if the fruit was cooled at once when it came from the vines, it would keep and ship much better than if not so handled. These and other questions he had studied out as a matter of business. All this had cost him time, money and labor

Doubtless his neighbors though he had better be at work instead of fussing so much, but he was a business farmer and knew he must thoroughly understand his business, if he was to make a success of it, and the twenty-five per cent. extra price obtained for his fruit was not good luck, but payment for value received in a higher standard of quality obtained by business methods.

**In Grain Raising.**—Farmer take-it-easy thinks "there ain't much money in wheat when you can get only about twelve or fifteen bushels per acre, or in corn at thirty to forty bushels per acre." The business farmer knows he must get more than that or be bankrupt in time. He will tell you just what it costs to produce a bushel of corn or wheat, and show that we must increase the yield or lower the cost of cultivation per acre; and as the latter cannot well be done, the one and only thing to do is to produce more, by a more thorough preparation of the soil for planting, and still better care for the growing crop. If it is possible and profitable to produce thirty-five to forty bushels of wheat per acre, and seventy-five to one hundred bushels of shelled corn, we should do so, and the business farmer, who is producing this class of farm crops, sets about doing it—first by cutting down the number of acres cultivated to the number he can thoroughly attend to, and then aiming to obtain the greatest results, or know the reason why.

**In Animal Husbandry.**—Beef, mutton and pork are staple crops on many farms, yet how many of us know what it costs us per pound to produce, and if, on the whole, a profit is made in the business, whether the profit comes from the young growing animal, or from fattening the more matured one? On this point the late Hiram Sibley, of Rochester, N. Y., a gentleman who made a fortune at farming long before he went into other branches of business, in the course of a long chat on the train, told me that living in the dairy districts of New York he found the farmers so anxious for the milk product that all calves were sold or killed as soon as born, and that instead of growing their own cows they were continually buying new ones at high prices. Being a business farmer, he converted his whole dairy into a nursery for the raising of young calves, and brought them up by the hundreds. When a few months old, and a car-load was ready, they were shipped to his farm in Illinois, where feed was cheap, and were then fed and cared for in the best possible manner, to keep them growing all the time. When full grown, they were promptly disposed of to make room for other younger and growing animals, for, said Mr. Sibley, I had learned, after several years' careful test, that the only money to be made on an animal was in growing it. Not a dollar was ever made in fattening. Mr. Sibley has been called a fortunate man, but I am satisfied that had he not been a business farmer, and known from the start what was and what was not profitable, he could never have made the success in life that he did.

**Do Business for Cash.**—The business farmer does business on a cash basis, well knowing that he cannot afford to do otherwise. If he has capital of his own, so much the better, but be he rich or poor he always has cash on hand for the purchase of such supplies as are required for the proper conducting of his business, and also to be ready to take advantage of any good trade which may develop in the direct line of his work. The poor man who is a business farmer knows that the buying of implements,

supplies, etc., on credit, means buying at the very last moment before being ready to use them, and thus being obliged to buy such as can be had in the nearest market, and paying the highest retail price for them, which, on most farm implements, and many household supplies, is from thirty to fifty per cent. advance on manufacturers' prices. He is therefore as liberal a borrower of money as his credit will allow, and the legitimate requirements of his farm and home demand, just as is the enterprising merchant or manufacturer. He is thus able to watch the markets, and, knowing his future wants, has ample time to correspond with headquarters and obtain lowest quotations; and then, by buying out of season, get "bed-rock" prices every time, saving enough to pay the interest on his borrowed capital many times over.

A Case in Point.—Just one case in point: A business farmer, a friend of mine, who knows that it is to his advantage to subscribe for and read ten or more of our agricultural papers, learned last December that fine ground bone, potash, nitrate of soda, and other chemical manures, that he required for use on his farm in the spring, could be bought at very low rates; therefore, making out a list of just what he wanted, he wrote to six or eight importers and manufacturers, asking quotations on forty tons of goods for immediate delivery and for "spot cash," although at the time he had not the money to pay for two tons. All the dealers were glad to bid low for so large a cash order, four months before the usual time of making their sales. Consequently, he was offered No. 1. goods at extremely low rates, and accepted one of the bids, borrowed fourteen hundred dollars, and, when bill of lading was received, paid down the cash.

The fertilizers were carted at a season when his teams had little else to do, and thus quite a saving was made.

Four months later, when ready to use the goods, his neighbors, who do not practice business methods, were paying an average of nine dollars more per ton for the same goods, and as twenty-eight dollars paid the interest on his borrowed money capital, he made a net cash saving on that one trade of three hundred and thirty-two dollars—quite a little sum of money to be made out of one transaction, and yet honestly made by applying business methods to the purchase of farm supplies.

No Use for Agents.—The business farmer has no use for agents or surplus middle-men. He is not induced to buy every new thing that turns up, and pay a fancy price for it, but is his own agent, does his own thinking, and when, in his judgment for the better conduct of his farm or household operations, he counts the cost and estimates whether it will be profitable for him to invest or not, before he purchases.

Brains Are at a Premium.—In fact he is a man who minds his own business rather than to pay some one else for doing it for him. He is not averse to picking up all the information he can by association with others. He is therefore a worker and student in the local farmer's club or grange, is never so busy but that he can find time to attend institutes, Pomona granges, agricultural and horticultural meetings of all kinds that are within reasonable distance of his home. He knows that brains are at a premium on the farm, and while continually polishing his own by contact with others, his boys and girls are given the best possible education in the home schools, after which he will send them to the State University for a full course of scientific

training, if he is able, and if not (if a resident of Wisconsin), he will see that the boys take advantage of the short term course that is offered by the University at Madison. Not only the business, but every other farmer having boys, should eagerly accept this grand opening which has been made whereby his boys, even though required to be busy at home through the summer, need not be deprived of a classical and scientific education. There should be three or four hundred such students at Madison every winter, from the farm homes of this State. Keep this up year after year, and the intelligent, successful business farmer will be the rule, and not the exception; farmers will take their proper position in society, and before the world, every farmer will be a business farmer, receive a just compensation for his labors, or know the reason why.

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# HOW TO FEED A FARMER.

By J. RHODES, Kansasville, Wis.

**The Best Brain Food.**—Observation has developed the fact that the best brain food is that which keeps the body in the best and healthest condition. Body and mind are so linked together that an injury to one is usually a damage to the other, and a benefit to one an advantage to the other.

**The Process of Digestion**—Is analogous to combustion. Its chemical changes generate heat from the food we consume, and supply warmth to the body. This heat is so wonderfully regulated as to remain about the same summer and winter, although the climactic temperature varied here last year about 130 degrees. There are some things about the generation of animal heat which are still a mystery, and must be left to the best talent of the land to explain. It seems, however, that digestion in some way eliminates carbon from the food we eat, and this carbon is carried by the blood to the lungs and here meets the oxygen of the air we breath. They unite to form carbonic acid. The union of the two elements generate heat just as is done in the chemical process called fire.

It is evident, then, that we do not need large quantities of carbonaceous food during the heat of summer. Therefore the farmer's wife who puts fat pork, fried cakes, and corn-bread on the table, with the thomometer at 102° in the shade, violates a law of nature, and the stomach, the liver, and the hired man promptly rise up in rebellion. If the great Napoleon lost a battle through eating a bad dinner, how much are some of our Wisconsin farmers losing annually through a succession of poor meals—losing physical vigor, and mental activity.

**Providing Food.**—The husband who provides nothing but a dish-cloth for his wife to cook a meal from must not expect a royal feast, and if there is a man on the face of the earth who has the means to provide for his wife healthful, nutritious food for culinary purposes, it is the Wisconsin farmer. For meat he has poul-

try, mutton, veal, beef and pork—all of which can be kept fresh during the winter months, and much of it can be cured so as to be quite palatable during the coolest weather of summer. It is certainly poor economy for farmers to sell meat to butchers at five and six cents per pound, and then buy it from the grocer the next summer at 15 to 20 cents per pound. Farmers must learn to cure their own meat.

**Food From the Garden.**—But the best, most bountiful, healthful and varied supply of food for the farmer's table should come from the garden. In vegetables, the variety is legion and suited to all tastes. The crisp, rich and juicy samples growing in the farmer's garden one hour and gracing his table the next bear no resemblance to the wilted, half decayed truck which city people have to eat.

**Small Fruits.**—Next, look at the list of small fruits within our reach. Beginning with strawberries, they furnish a continuous banquet from June to November, and include cherries, currants, gooseberries, raspberries, blackberries and grapes. Without invading women's realm, by telling how to cook them, all of these could be eaten, when fully ripe, with sugar and cream. Being consumed at home they can remain on bush and vine to distil from earth, air and sunshine, ambrosial nectar which would almost tempt St. Peter back to earth. The hard, sour, and immature fruits which are picked to ship, no more resemble those properly ripened than raw potatoes resemble Saratoga chips.

**Feed the Mind.**—In distributing the good things of earth to the millions of all nations, let the farmer not forget the family under his special care, and who are depending on him for physical growth. Above all let him feed their minds for the life struggle which lies before them, teaching them their responsibilities as future heads of the families and members of that great thinking, conservative body of farmers who must in the future even more than the past be the mainstay of the nation, upholding society and government against the selfish, brutal and chaotic schemes of the ignorant, irresponsible, floating population of our large cities.

# CLOVER FOR FERTILITY AND FEED.

By CHAS. V. GUY, River Falls, Wis.

**Barnyard Manure the Best.**—In the St. Croix Valley there are found all varieties of soil, from sand to clay, mixed often with vegetable mold, forming either a sandy or clayey loam. Each is adapted to the growing of a different class of crops, and each requires special treatment to increase or support its fertility. As barnyard manure contains in due proportions the essential elements of plant food, it is applicable alike to al soils—finely rotted as against green coarse, strawy manure, for dry, sandy land, while the reverse is suitable for clayey soils.

**Plowing Under Green Crops.**—The ordinary farmer finds, with all his care and pains-taking, the supply of manure, as obtained from the consumption of home-grown crops, quite too small to adequately fertilize his fields, and his only resort is commercial fertilizers, or plowing under green crops. The former, except gypsum and salt, are quite too expensive to repay the cost of $25 to $60 per ton in any field crop at present market prices. This leaves clover practically as our only remaining source of supply. How shall we apply it? is a serious question. The readiest answer is, feed it to stock and get a return in animal growth, and from two-thirds to three-fourths of its value in manure. But this requires more capital and labor, brains and energy, than the average farmer can command. Then let the earth act as consumer and feed the whole crop at once by turning it under with the plow. The results will be in proportion to the growth of the crop plowed under.

If the year's growth is too expensive, a crop can be taken off at the first blossom and left until the second growth is in bloom in the following August, when this may be plowed under. A large part of the value of the crop for fertilizing is in the root. This treatment leaves the ground in most excellent condition for any kind of crop. Land plaster has a very beneficial effect on the growth of clover on rather sandy or clayey land. An application of from one hundred to one hundred and fifty pounds per acre will increase the crop fifty to one hundred per cent., and its effects are quite noticeable for two or three years after sowing It is not claimed that there is great manurial value in gypsum, but it is claimed, by the highest chemical authority, that it acts directly in fixing the ammonia, which is an essential plant food, in the soil just where the plants can use it; while without the chemical influence of the plaster the ammonia would be evaporated by heat and lost to the soil.

**A Valuable Experiment.**—An experiment is reported where a quantity of clover plants was taken from the earth in May, about a year after planting, the earth being removed by a stream of water. The roots were set in sand, or crushed rock, from which all plant food had been carefully removed, watered with distilled water for some two months, until the blossoms of the plants matured, and then analyzed. It was found that the organic elements had increased nearly three times and the ammonia nearly doubled. This result was obtained from the air and water alone. The ex-

periment goes to prove that clover will grow on our poorest sandy soils in a wet season and, by a system based on the result of this experiment, our poorest lands may be profitably cultivated.

**Sowing Clover Seed.**—It is claimed that a pound of clover seed contains nearly two hundred and sixty thousand grains. This estimate, I think, by an actual count of a weighed quantity, is very low. Twenty per cent. may be safely added to it. One pound, about a pint, gives, on this basis, six or more plants per square foot, if evenly distributed. This is quite as much as the land ordinarily shows one year after seeding. The practice of most farmers is to sow from four to eight quarts per acre, mixed with small grain at the time of spring seeding. Clover seed covered over one inch, it is said, will not germinate. If this is so, a great loss is sustained by too deep covering of all seed sown by mixing grass seed with small grain, and sowing with the ordinary drill or seeder.

**Cutting and Curing**—Of cutting and curing clover for winter food there are almost as many methods as farmers. If the weather is favorable the process is very simple. Cut when dry of dew or rain, let it wilt, turn with a tedder and haul the same day; put in a tight bay or silo, keep covered from air and, though much discolored, its nutritive properties are well preserved. Clover free from external moisture will keep in a tight barn, if put in very green. A peck of salt to a ton of dry hay will tend to prevent dust, and makes it palatable to all kinds of stock. From a single year's experience with clover ensilage, I should not recommend building a silo for green clover.

**Feeding.**—Contrary to general opinion, I have found clover hay the best coarse food I have ever fed. I have fed it to all kinds of stock, and prefer it to any other hay for horses, except for driving horses, it being to relaxing for quick driving. But for the work on the farm, or even heavy hauling, it has been intirely satisfactory. A patch of clover for growing hogs provides a very cheap and nutritious food; but of dry clover hay, they will not eat enough to perceptibly effect their growth. For a pasture for all kinds of stock, it is of little value. Being a biennial, it makes its seed the second year and ordinarily dies out. Other grasses must be provided to take its place, and it is best to plant them at the first seeding. Where clover winter-killed the winter after sowing, in two cases, I have dragged the ground and re-seeded in early spring with excellent results.

Clover hay, fed with corn ensilage and a small ration of wheat bran, has produced with me excellent results, as a food for dairy cows. In one instance I fed clover hay with dry oats to a horse badly affected with the heaves, and never had him do so well on any other feed.

**The Best Forage Plant.**—In my experience, next to corn, I have found clover the best of all our forage plants. Its deep running roots obtain their food from a lower stratum of soil than most other plants, and it will remain green and vigorous when many of the grasses, and nearly all root crops, are more or less injured by drouth. It derives a large proportion of its nitrogen from the air, and thus draws but lightly from the fertility of the soil. On our alluvial lands, it is quite practical, by a system of rotation with corn or potatoes, a crop of small grain and one of clover, the aftermath being turned under, with one

dressing of land plaster, at a cost of 40 cts. or less per acre, to raise a paying crop for an indefinite number of years, and not exhaust the soil. This can be done with no other plant with which I am acquainted.

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# MONEY IN SMALL FRUITS.

By J. H. HALE, South Glastonbury, Conn.

**The Value of Money.**—My subject has a very pleasing sound, for who of us, tillers of the soil, does not jump at the chance of any honest industry that there is "money in?" Not that the gathering or accumulating of money is, or should be, the chief end of life, yet we all know and appreciate its value in securing for us the comforts and necessities of life, and should neglect no honorable opportunity to obtain enough of this world's goods, that our families may not be denied these things.

**An Infant Industry.**—The subject, "Money in Small Fruits," would indicate that the planting and cultivating of these choice gifts of nature were to be carried on for the sale of the products, and to this part of the question we will now turn our attention. Of course you will understand that the term "small fruits" applies to strawberries, raspberries, blackberries, currants, gooseberries, etc., and not to small or second-class apples, pears, plums, etc. It may well be called one of our infant industries, for it is within the memory of most of the middle-aged men here, that the first berries were offered for sale in any of our markets. The principal development of the business has all been within the past twenty years, and it is really only within the past ten years that all the small towns and villages of the country have begun to have anything like a fair supply, while there are yet hundreds of towns and villages that are not one-half supplied, and those that appear to be well furnished now would use many more if better fruit were offered and in a more attractive style. So there is a chance yet for new beginners, if they are willing to live up to the requirements and demands of the times. However, before attempting the business it is well to know that not all cultivators of berries have found money in small fruits. In fact there have been some very serious failures.

**Requirements for Success.**—The requisites for success are:

1. A love of fruits for their own sake; a pleasure in their culture.
2. A soil fairly well adapted to them.
3. Good local markets, or convenient access to railway lines which center in market towns.
4. Extra laborers, near enough at hand to be called on, in case of emergency, in cultivating and gathering the fruits promptly and economically when ripe.

Having made sure of these things, if one is starting in business, care should be taken not to plan for planting more than can be cared for in the most thorough manner, or sold to good advantage.

**Strawberries.**—Of the various fruits,

strawberries will receive first attention, as it is from them that the quickest returns may be expected. Any good corn or wheat land will produce fine strawberries, but to secure the best results, it must be very rich in natural fertility, or made so by the application of manure in some form. My own experience has been that any soil rich in organic matter, or fertilized with stable manure or commercial fertilizers rich in nitrogenous matter produces too much foliage growth for the most profitable returns in fruit; and my best crops have come from a sandy or loamy soil, where commercial fertilizers had been used containing a large percentage of phosphoric acid and potash, but lacking in nitrogen.

However, as the use of commercial fertilizers does not, as yet, enter largely into the question of culture in this section of the country, it may not be well for me to say much on this subject.

Preparing the Ground.—Land that has been in cultivation for a year or two previous is best. Plow this as deeply as possible early in the spring; then harrow it over and over again until a perfect seed-bed is formed. An extra day or two spent by a man and team in a thorough preparation of the land, will usually show itself in ease of cultivation later in the season.

Setting the Plants.—When the ground is thoroughly prepared, with a corn-marker, check off rows three feet apart, and set the plants from twelve to twenty inches apart in the row, according to the vigor of the variety. If pistillate or imperfect flowering varieties are used, plant every third row with some strong, perfect flowering variety that blooms at the same time. Too many make the mistake of planting a greater number of rows of pistillates before adding the perfect bloomers to fertilize them, and also make the selection of varieties without regard to the time of blossoming.

Cultivating.—Cut off all blossoms or fruit stalks as fast as they appear, and as soon as growth is well started, begin the summer cultivation, which should be kept up once in two or three weeks all through the season, until weed growth is stopped by freezing in the fall. On my own plantations the last hoeing is usually done in October.

The Narrow Row System.—Having been growing berries for market for twenty-five years and testing the various systems of hills, narrow rows and matted rows, as well as studying results obtained by these methods in all the Northern States, I am satisfied that the narrow row system is on the whole the most profitable. By this method, each of the spring set plants is allowed to root a few of its first runners, along near the line of the row, after which all the runners are cut off as fast as they appear. The advantages of this plan are that more of the work of cultivation can be done by horse-power, as in hill culture, and yet there are always young plants enough to form one continuous row, even if a few do get destroyed in any way. There is abundant room for sun-light and air to reach all the berries when ripening, which assures larger, better colored and higher flavored berries than can be grown in matted rows; also firmer fruit that stands transportation much better, and sells for higher prices.

There is another advantage in this plan. It costs but little to clean out a bed of this sort after fruiting, and so renew it for another season's crop at little expense, while in matted row culture it is seldom profitable to continue a bed in fruiting more than one year.

Mulching.—When the ground is frozen in the fall, cover the whole field

lightly with a mulch of old hay, straw cornstalks, or any coarse material that will protect the plants against the alternate freezing and thawing of late winter and early spring. This need not be removed, but when growing time approaches pass along the rows and partially uncover the crowns of the plants, that the new growth may push up through it. Thus the mulch can remain to keep the ground moist, and the fruit clean during ripening season.

**Importance of Moisture.**—This question of moisture at ripening time is a most important one. Many a field of strawberries that has received fairly good care during the whole year, has failed to produce profitable results, simply for the want of sufficient moisture, just at the fruiting season. Therefore, where it is possible, without too great cost, irrigation should be provided, if the highest results are to be obtained. Where the markets are large enough to readily handle, year after year, the product of five or more acres from one farm, I am satisfied that an investment of from one to two thousand dollars for irrigation purposes would pay handsomely. However, as such an amount of capital cannot well be so invested by many planters, and cheaper means of obtaining an abundant supply of water are not to be had except in rare cases, therefore, I urge a thorough preparation of the soil for planting, and frequent cultivation that the plants may root deeply and thus be able to withstand drouth, which comes so often just when we least expect it.

**Gathering and Marketing.**—In gathering and marketing the crop there should be one picker for each thirty or forty quarts of the daily product, and a superintendent to every fifteen or twenty pickers, to assign them their rows and inspect their work from time to time; to see that they keep to their rows and do not trample on the vines. Pick the fruit clean and grade it according to the demands of the market to be supplied. Upon the thoroughness of this superintendent's work will depend, in a large measure, the success of the business.

Picking, except for local markets, should not begin till the dew is off in the morning, and should not be continued through the heat of the day. If pickers enough can be had to rapidly gather the crop, from four o'clock till dark is much the best time.

**Packing.**—The packing shed should be a cool, airy place, convenient to the field, and here all the fruit should be brought as fast as gathered. A general inspection of the fruit should be given by the person in charge, and it should be packed according to its grade, each variety by itself. Baskets or boxes should be new and clean, and made of the whitest wood that it is possible to obtain. All should be as rounding full as can be conveniently packed without injury to the fruit. There should be no inferior fruit put in, and that in the bottom and middle of the package should be just as good, or better, than that on top. Having made sure of this, these should be carefully packed in clean, bright crates or boxes of the size required by the markets where the fruit is to be sold. It is usually good policy to conform to the customs of the markets whose trade we seek. However, where we find those that have not attained a high standard, it may be well to humor them to the extent of sending second-class fruit in the old style, and market our best in the most approved packages obtainable. It will attract attention to our goods, and win favor and custom, especially if we guarantee every package to be as represent-

ed. We can not afford to spend eleven months in careful cultivation of our fruits, and then accept inferior prices, simply for the want of a little care in the details of marketing.

**Raspberries**—Red, black and yellow, following strawberries as they do, should next receive the attention of one who is after the "money in small fruits." These require much the same soil as strawberries, except that they may be grown with profit on land that is far richer in nitrogeneous matter.

**Planting.**—Fall is the best time to plant all but the cap varieties. The ground should be as thoroughly prepared as for strawberries. For years I have planted in rows, six, seven or eight feet apart, according to the vigor of the variety, placing the plants two and one-half to three feet apart in the row; but I am now satisfied that larger, finer and better berries can be grown by planting in check-rows five or six feet apart, giving the plants more sunlight and air and admitting of more use of the horse and cultivator, thus securing better culture at less cost, while the yield of fruit is fully as large as from the hedge-rows.

**Cultivation.**—Cultivation should begin early in the season, and be frequent and thorough through the summer months, so as to stimulate a rapid growth early in the season, giving ample time for maturity of wood during the fall.

The new growth should be pinched back when fifteen to eighteen inches high. This will cause a strong growth of lateral branches, which should be allowed to grow at will, leaving all further trimming till early the following spring.

**Winter Protection.**—Few, if any, of the best varieties are hardy enough to endure the winters of Wisconsin without some protection, if you are to make sure of a crop annually. It is therefore best to lay them down and cover with earth at the approach of winter. This can be done at a cost of from five to eight dollars per acre, and is a cheap method of insuring a crop, so far as the extreme frost might affect it. As soon as frost is out, and ground is dry enough in the spring, uncover and straighten up the plants; thin out and shorten in the laterals from eight to fifteen inches, as may be required to form a well-balanced bush.

Thorough cultivation may be given up to blooming time, after which it is not well to stir the soil till after fruiting.

**Gathering and Marketing.**—The gathering and marketing should be on the same general plan as for the strawberries, except that pint boxes or baskets should be used in place of quarts for the most delicate varieties.

**Blackberries**—Should next receive attention, and as they are generally inclined to make too much wood growth, it is well to select land of moderate fertility.

The high bush varieties may be planted either in spring or fall, the latter being the best; planting the same as the strongest growing raspberries, while the dewberries or trailing blackberries should be planted in the spring in rows ten feet apart, plants three to four feet in the row, and allowed to form a matted bed.

Close pruning and winter protection are essential to the highest success in blackberry culture, as with raspberries.

**Gooseberries—Currants.**—There is only a limited sale for gooseberries, but for currants the demand is still far greater than the supply.

**Soil—Cultivation.** —Strong, rich, fairly moist soil is best for the latter. they may be planted at any time after their leaves drop in the fall, or very early in the spring, in check-rows, four and one-half to five feet apart. The growth

is all made the first two months of summer. It is therefore essential that the cultivation be thorough and liberal early in the season, if we wish to stimulate the best wood growth.

Pruning.—The first two years only enough pruning will be required to form a broad open-headed bush, with bearing wood evenly distributed; but in later years a pinching back of all the new growth when two or three inches long will tend to develop a wonderous formation of fruit spurs and buds.

General Principles.—In a general way I have now outlined some of the main features of small fruit culture, and now lay down a few general principles that must be lived up to if you are to find the "money in small fruits."

FIRST.—Thorough culture.

SECOND.—The best possible shipping packages.

THIRD.—Honest packing of fruit from top to bottom, yet making as fine an appearance as possible.

Varieties a Local Matter.—As to the question of varieties, that is a local issue which it is best to study out for yourself. Study the markets that you are to supply, then visit growers in your county and State, learn from them what are the well-tested and approved varieties, and make the largest share of your plantings of these.

The world is improving all the time, and so are our small fruits; yet don't rush head-long into highly-praised new varieties. Test them all in a small way, and you will surely find some that are just suited to your soil and market, thus obtaining for yourself an advantage not possessed by others.

Net Profits.—With culture such as I recommend, strawberries should yield four thousand quarts per acre, should sell in your markets at about eight cents per quart — a net profit of one hundred and fifty dollars per acre.

Raspberries should yield about three thousand quarts per acre, which, at ten cents per quart, will net about the same profit as the strawberries.

Blackberries should give rather more quarts than raspberries, but selling for less price the profit is not quite as great.

A good product of currants is from fifteen hundred to two thousand quarts per acre, and the price I suppose here is about six or eight cents; but as a field of currants may be kept in fruiting for an indefinite number of years, it is one of the most profitable of all the small fruits, as the cost of culture is so much less than any of the others. Strawberries have to be renewed every two or three years, raspberries and blackberries every five or six, for the best results.

The Family Small Fruit Garden. — To get at bottom facts as to "money in small fruits," the family garden is the place to begin and end, if we are looking for greatest results. Every farmer should, and will have, when he awakens to a full sense of the duty he owes to his wife and loved ones, a family small fruit garden of a half acre or more, in proportion to the size of his family, and his real interest in their welfare, for right here he has a home market that will take at high prices, every day in the week, quarts upon quarts of the choicest product of his plants.

Fruit as Diet.—The importance of fruit as an article of diet is at last beginning to be appreciated, and the sooner we all understand that every dollar expended on the fruit garden will save at least two dollars in butchers' and doctors' bills, the better. Three times a day the whole year round our tables

could and should be supplied with these refreshing and health-giving fruits of our own growing. How much better for the boys and girls at school to have a dish of fresh berries, a cluster of grapes, or a cup of raspberry jam, and good nutritious bread and butter for their dinner than to have the mother slave herself to death from day to day in preparation of some health-destroying compound of grease and spices in the shape of loaf-cake, doughnuts, or mince pie, to tempt the appetite and destroy the stomach, as well as a lot of good flour, eggs and butter that might be used to give health and strength rather than destroy it. I note with pleasure, in my travels, that fruit-growers and such farmers as have plenty of fruit, very seldom have pastry of any kind on their tables, its place being supplied by fruit, either fresh or canned; and since the improved methods of canning that have been adopted in the past few years, it is possible to have fruit at any season of the year, approaching in flavor that fresh from the vines, red raspberries retaining their flavor the best of all.

The taste for fresh fruit is growing fast, and while many of our farmers know that they ought to supply it to their families, they still fight shy of planting, and say they can buy what berries they want cheaper than they can grow them; yet they will not buy one-hundredth part of what their families would use if it could be had for the picking. My own family is not a large one, yet we manage to dispose of from six to ten quarts of strawberries, raspberries, currants, and blackberries, per day through June, July, and August, and the next three months we worry along on peaches, pears, and the product of 116 grape vines.

A friend of mine having a half acre city lot, bought his fertilizers, hired the land plowed, and planted thereon, twenty-six dollars worth of plants, kept an account of all money paid out for labor for five years, and charged the family, at market rates, for all fruit consumed. He told me that this half acre paid him a profit of one hundred and sixty dollars annually. Such a half acre should be on every farm. Your wife and other loved ones will appreciate it, and you shall see that there is health and happiness as well as money in small fruits.

# BREEDING AND FEEDING SHORTHORNS.

By P. WAKEM, Manager of W. H. Jacobs' Premium Herd of Shorthorns, Madison, Wis.

**Selection of Cows.**—I would advise you, in making your selection of cows, to establish the foundation for a herd of Shorthorn cattle, to first make up your mind as to the kind of an animal you want; to inform yourself somewhat on pedigree; then go to what you consider an honest and reliable breeder. Herds of Shorthorns are so numerous that you should have very little trouble in finding one containing such animals as you would desire to buy. Then, if you wish to select a cow for beef principally, I would select a low-down, short-legged animal, a good mellow handler. Never mind what color, whether red, white or roan. If you wish a good milking cow, you would, of course, be sure to go to a herd that had been handled with a view to the development of the milking qualities. A great deal depends on the management of a herd as to whether they are good milkers or not. I think a man can develop that quality in the Shorthorn cow to a wonderful extent, by paying proper attention to the feeding and milking.

**About Pedigree.**—I would advise you not to be too particular about getting a so-called fashionable pedigree. Some one who, perhaps, does not know half as much about cattle as you do may say that they have an out or unfashionable cross in them, tracing back to the importation of 1817, over 70 years ago. You would naturally think it bred out before now, even if their breeding were not kept track of prior to that date, as it should have been. Nor would I advise you to look too much to individual merit, as sometimes you will get a very good animal of great individual merit which will still be a very unsatisfactory breeder. For myself I would much rather have an animal with a good long pedigree, known to have come from a family of good milkers and great beef producers than one of extraordinary individual merit which I do not know came from a long line of great ancestors.

Be careful to buy cows standing squarely on their legs, wide between the fore legs, thick through the heart, with good crops, strong loins, broad hips — good mellow handlers. Observe these points, and, my word for it, you will have cows that will take on flesh rapidly, and prove good breeders, if judiciously bred.

**The Head of the Herd.**—After having bought the number of cows you wish to start with, select and buy a sire to head your herd. A great deal now depends on the kind and quality of cows you have bought. If they stand a little too high on their legs, be sure and buy a sire that is short on his legs. If they are not very good in fore quarters, get a sire that is well developed in front. If your cows are a little defective in hind quarters, be sure and get a sire that is well developed in this respect. Do not fail to get one with a good masculine head, as he will surely make the most impressive breeder. Did you ever notice, in your feeding lot, a steer with a long, fine head and really premium in looks? If so, was he a good feeder? Never.

You must get the short, thick head, with good strong jaws with the ability to crush an ear of corn, to be a good feeder; and you can never get such unless your sire has a good, strong masculine head on him. Be careful to get an animal with a good loose hide—a mellow handler—as that will tell you whether he is a good feeder or not.

Never forget in purchasing that your bull is half your herd, if not more, as every calf you raise from him, if an impressive breeder, will, in all probability, take more after him than the dam. Do not buy some overfed brute that has been kept in the stable and pampered from birth, but one that has been well fed and exercised. Do not be too particular about his color. You might, with good grace, be a little particular about your sire's pedigree, as it is much easier to breed on a good cross than breed out a bad one.

Proper Age to Breed Cows.—The proper age to breed your cows is at or about 24 months old, never allowing but one service. Then the cow should be tied up, or put in a box stall, and kept by herself for at least twelve hours after breeding. If cows are in good flesh and on grass, I would give no rations or grain until, perhaps, two months before calving, when I would feed a small ration of ground oats and wheat bran. Ten days before calving I would give a little oat meal, and, if in winter, I would add a little corn meal and roots, with hay, always being careful to allow plenty of exercise. After calving, I would feed very carefully, being particular to keep udder well milked out; after ten days I would increase her feed, always feeding plenty of roots in winter, as there is nothing our cows seem so anxious to get as their feed of Swede turnips once a day.

A cow, if in good flesh and health, will usually come in heat four or five weeks after calving, when, if I were in shape to take care of her at calving time, I would breed her again. We like our calves to come in the fall, as we can take better care of our cows and calves in the winter than in the summer, and as it makes the bull calves about fifteen months old in a year from the next spring, when they meet with ready sales.

Care of the Calf.—The calf should be allowed to suck as often as it wishes, for the first ten days, and kept away from the cow after that, except to allow it to suck three times a day, at regular intervals of time. I would let it suck three times a day until three months old, when I would allow it with the cow only twice a day, and at the age of six months would wean it. Always have plenty of water where the calf can get to it, as it is very fond of a little water, especially after sucking. When your calf is about four weeks old, you should place a box with some ground corn and oats, a little wheat bran and some sliced roots, where he can get to it; he soon learns to eat it. If in winter, you should keep hay where he can get to it all the time. After they are three months old, I never have seen calves do better than they will on shelled corn and oats, wheat bran and sliced roots, always feeding two-thirds oats and one-third corn.

There is nothing more essential in successful feeding than regularity. If Shorthorn calves are fed regularly, and as I have described, you will have no trouble in putting one hundred pounds a month on them. After they arrive at the age of 12 months, I believe all grain rations should be ground and fed. In summer I do not believe in feeding much grain. Calves should, of course be fed, as they must be kept growing from birth, and never allowed to lose their calf fat. Taking the whole year, I

would, perhaps, feed stronger than some men, as I thoroughly believe there have been hundreds of Shorthorn cattle spoiled by not feeding enough to every one that has been hurt by feeding too much.

**Shorthorns as Improvers.**—The Shorthorn sire as an improver of all other beef breeds, as well as the native or scrub, has no equal. Some of the other beef breeds make a remarkably good first cross, but afterwards the improvement is less marked than in the Shorthorn. Take a Hereford sire and cross on the native or scrub cow, and your first produce will, most likely, be a white-faced calf. Then take the cow calf and, when at the proper age, breed her to a pure bred Hereford, and the produce is more likely to be a speckled or roan that it is to have a white face. For several years of my life I was connected with a ranchman who was the owner of ten thousand cattle, and I thoroughly believe one of the best informed men on breeding I have ever met—a man who had experimented and carefully studied, and amassed a fortune of nearly one million dollars and has it yet. He tried nearly all the beef breeds and finally discarded all but the Shorthorn. I have known him to take bulls worth to sell four hundred dollars each and turn them out on the ranch to breed his cows to, but he was careful to take them up when breeding season was over and feed and care for them until time to turn out again. He always claimed that where his cattle were located (Wyoming), they were better rustlers and made more improvement than any other breed, not only in the first cross but in each cross afterwards.

**As Mothers.**—The Shorthorn cow makes one of the finest of mothers, always ready to protect her calf, although so mild and apparently intelligent when properly handled. I have heard that there are Shorthorn cows that will not give milk enough to raise their own calves, but in an experience of over twenty years I have never seen one of that kind. We have at present a pure bred cow only 3 years old, and weighing over 1900 cwt., and has had her second calf, that is giving twenty quarts of milk a day. She is not fed high, or in a way to make her give much milk. She was one of our show heifers for two years. In fact, I have seen hundreds of Shorthorn cows, and pure bred ones, too, that would give two 12-quart pailfuls a day when in full flow of milk. If a farmer can raise that kind of a cow, one that is a good milker, and when he is through breeding her he can turn her off for beef, at a great weight, what more does he want? I think he should feel satisfied with her.

**Why Use Scrub Sires?**—Does it not seem strange that there are not more pure bred sires used? They are certainly cheap and plentiful enough. It is either ignorance or indifference that makes men use a scrub sire of any kind or breed of stock. They will not pay the small amount asked by the publishers of agricultural and live stock papers to read and inform themselves, and have no ambition to learn, believing in their own narrow minds that they know it all now. So they continue in the old ruts. Scrubs are good enough for them; they are scrub men.

**Buy Some Good Cattle.**—A short time ago we concluded to have more stock to eat up our surplus feed, rather than sell it off the farm, as we need all the manure we can get. Not knowing where we could get three or four carloads of high-grade steers in Wisconsin, we concluded to go to Chicago. We went into the Exchange building, to the

office of our commission man, and made our wants known. "Well," he said, "of course you want well bred ones? You will see very few coming from Wisconsin." It was really surprising to see the small number of good cattle there were among the twelve thousand on sale that day. Any farmer who will go to Chicago and see the difference in price between well bred steers and scrubs or natives and not go home and sell the scrubs and buy some good cattle, does not deserve to ever be able to own any. I would like to know what better investment any farmer can make than to buy a Shorthorn cow or two, give a growing up son, and then advise with him as to the proper manner of breeding for improvement. Buy books to read about pure bred stock; take all the agricultural and live stock papers within reach, for him to read. How much better he would be employed than in reading a novel, or hanging around the village store, and how much better you would feel to see the mind of your boy trained in that direction.

# UNIVERSITY OF WISCONSIN.

## ADVANCES OF THE PAST TWO YEARS.

In our first BULLETIN attention was directed to the fact that the University of Wisconsin had grown faster than the people's knowledge of it, and that a true university of the higher order was developing in our midst more rapidly than had been realized. The growth of the past year has given added truth to this since it has been exceptional not only in the increase of students and in the enlargement of the facilities for instruction, but also in the introduction of new and important features.

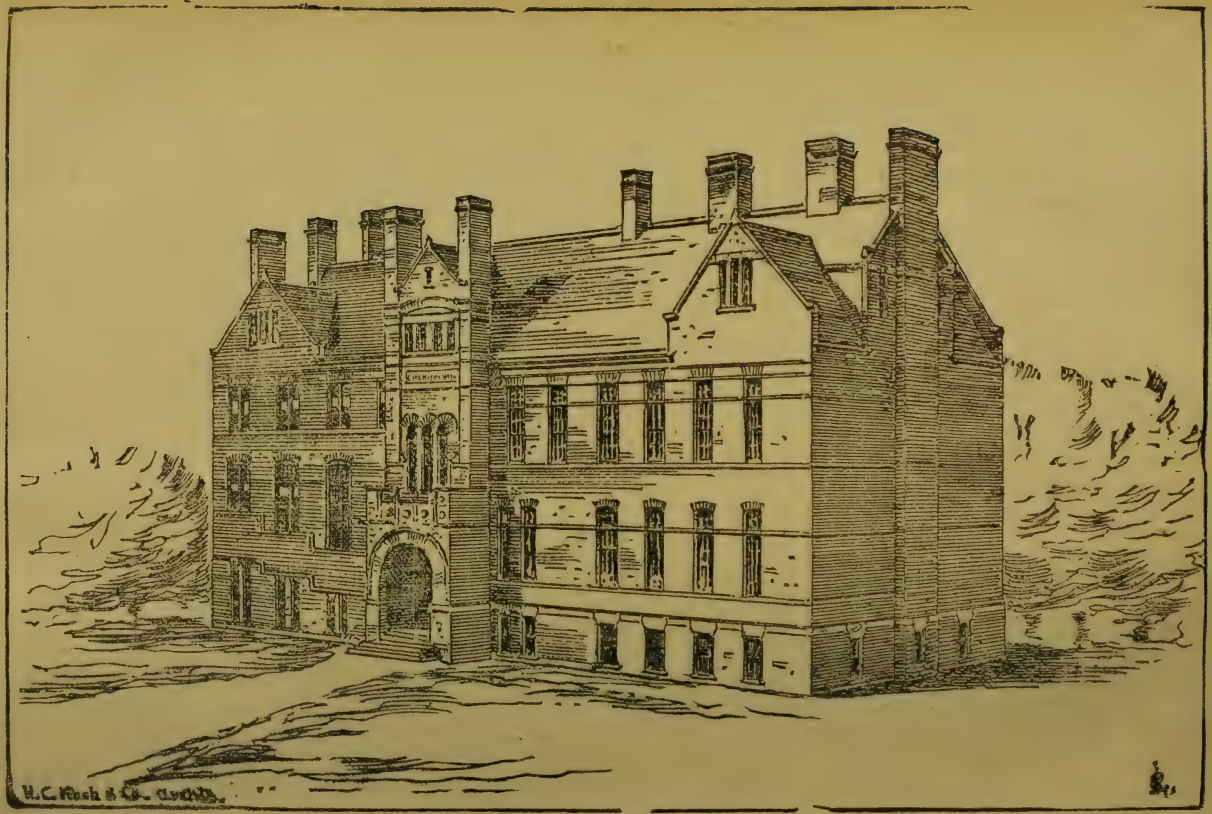
The increase in the number of students was fully twenty per cent., and these were distributed through the several departments in such a way as to show a well-balanced growth, and not an exaggerated development in some special line.

The completion of Science Hall — probably the finest building of its kind in this country — has added very greatly to the accommodations afforded for scientific work, and, by relieving the crowded condition of other buildings, has benefited nearly all departments. The purchase of large quantities of the very best modern apparatus and the addition of choice collections in the departments of metallurgy, mineralogy, geology, zoology, etc., together with a careful selection of laboratory manuals, of technical and scientific treatises, and of documents adapted to the work of the newly established *seminars*, have greatly increased the facilities for advanced instruction according to the best modern methods.

There have been added to the ten regular courses of study previously offered, three additional ones, namely, a special course in science antecedent to the study of medicine; a civic-historical course — or rather group of courses — antecedent to the study of law and journalism, and a group of special courses for Normal School graduates.

There has been introduced the German *seminar* system of work, which is intended to vitalize and extend the range of study, and to develop the spirit of original investigation in the historical, linguistic, literary, mathematical and other departments. This system has proved its superior efficiency in Germany, and has been introduced in a few of the foremost institutions in this country. It is believed that it will greatly stimulate and broaden the work in the literary departments, very much as laboratory methods and original research have done in the scientific departments.

There have been established eight University fellowships, and a ninth has been endowed by the liberality of the Hon. John Johnston, of Milwaukee. These fellowships are not to be mistaken for the ordinary under-graduate scholarships, as they are liable to be, since this is the first institution in the interior to establish them. They are open only to



THE CHEMICAL LABORATORY.

graduates from the regular courses, and provide for an extension of work at the University for two additional years. They will have the practical effect of elevating the range of the University courses to that extent. It is putting an added story on the intellectual edifice. The work will be of a higher order in kind as well as in subject, and will embrace original independent research.

There has been an enlargement of the facilities for independent and original inquiry in various lines, and this important phase of modern education has been industriously fostered. Notable additions to the equipment for such work have been made in astronomy and bacteriology, but the most important have been in the line of agricultural investigation. The equipment of the Experiment Station has been greatly increased. South Hall, which had been previously occupied in part by the agricultural department, has been wholly assigned to it, and has been, in large part, overhauled and refitted, and now furnishes very commodious apartments for it. The laboratory facilities have been fully doubled. New apparatus and a large invoice of important foreign works have been purchased.

A chair of agricultural physics, the first of its kind in this country, has been established, and work in this important department has been inaugurated. The professor occupying this chair will not only engage in original investigation, but will devote special attention to the development of the educational functions of the department, and will give instruction to agricultural students in the physical principles involved in farming operations.

That the growth of the institution is not tending unduly toward the professions and sciences is shown by the development during the year of courses in four additional languages as well as by the introduction of the *seminar* system and the post-graduate courses above alluded to.

Of like import is the establishment of a chair of experimental and comparative psychology — one of the very few in existence — through which an effort will be made to place the supremely important department of mental science in the foremost rank, and to introduce into this field, which has heretofore been so largely occupied with philosophy and speculation, the solid elements of experimentally determined science.

Some important changes have been made in the previously established courses, giving them greater elasticity and affording facilities for consecutive thoroughgoing study in selected lines. There has also been an enlargement of the number of elective studies, so that it is now possible for a student to modify any of the courses to suit his own mental characteristics and preferences to a very important extent. By taking advantage of elective studies there are really open to students an almost indefinite number of courses.

There has been an extension of the system of degrees corresponding to the extension of the University work, and the instructional force has been strengthened.

Some new regulations have been adopted regarding admission to the University, including a system of special local examinations. The standard of admission to the regular college classes, while not changed nominally, has in reality been raised.

# THE PROFESSIONAL COURSES.

**THE LONG COURSE IN AGRICULTURE.**—For some years past the University has offered an extended course in agricultural science, embracing, also, long courses in the closely related sciences. If the opportunities thus afforded had been embraced and industriously followed up, it would have proved a most wise choice to a score or more of talented young farmers' sons. There is just now, probably, a greater demand for thoroughly educated talent in agricultural science than in any other branch of learning. The rapid development of agricultural experiment stations throughout the country creates an exceptional call for ability and skill in that line, and if a few dozen Wisconsin boys who had the native talent had embraced the opportunity, they might now be putting shekels in their pockets and doing the world good and their State honor, at the same time. This course has been reconstructed during the past year, and is now offered with increased and constantly increasing facilities. How long shall it wait for due appreciation?

**THE SHORT COURSE IN AGRICULTURE.**— To meet an entirely different educational need, a *Short Course in Agriculture* is offered, designed to give, in the briefest time and at the smallest expense, the most available agricultural information. A special statement respecting the course may be found elsewhere in this bulletin.

**POPULAR EDUCATION.**— But the University is not content to simply rehearse old agricultural doctrines. Its chief effort is to develop new agricultural science and to disseminate it. This it endeavors to do in the most direct and practical way; first, by careful experiments and exact analyses to determine the precise truth, and secondly, by conveying this directly to the farmers by publications and by Farmers' Institutes, so that the *farmers themselves* are coming into direct relationship to the University. It might be too much to say that they are becoming non-resident students of the University, but it may at least be said that they receive information and instruction directly from it. The work of the Experiment Station is best shown by its fruits, and the most of those who read this will, doubtless, also read its reports and know for themselves. As to the work of the Farmers' Institutes this BULLETIN is a witness. In many respects the Farmers' Institutes constitute the most important educational movement of the past decade. That which is taught in them is practical, stimulating, vitalizing, and is probably productive of more thought, observation, inquiry, experimentation and reflection than an equal amount of instruction in any regular educational institution; and, while the amount is limited, the very large numbers in attendance make the total result very great. An institution which directly reaches 50,000 interested truth-seekers is something phenomenal.

**LAW COURSE.**— The location of the Law Department gives it exceptional advantages. Provided with rooms in the capitol, it is right in the midst of courts, legislative halls and executive offices, right among law-makers, lawyers and judges. Besides its own library the state law library (20,000 vols.), and the great historical library (116,000 vols.), are immediately at hand. Under these conditions the Law Department has had a rapid growth and is attaining a wide reputation.

THE CIVIL ENGINEERING COURSE. A full four years' course, embracing practical field-work, is offered and shorter special courses are permitted. The facilities are of the first order and are continually being improved.

THE MECHANICAL ENGINEERING COURSE.—The University endeavors to meet the growing demand for mechanical knowledge and skill of the higher order, both theoretical and practical, by furnishing a full four years' course in mechanical science, embracing extended courses in drawing, shop practice and practical testing. It has been found difficult to enlarge the facilities for shop practice fast enough to meet the demand for this popular element of modern education coming, as it does, from students in all the courses.

THE MINING ENGINEERING AND THE METALLURGY COURSES.—A four years' course is offered in mining engineering and also in metallurgy and assaying. These courses have suffered for want of facilities since the burning of old Science Hall, but the new buildings more than compensate for this, and a growth in these departments commensurate with the recent development of mining interests is anticipated.

THE PHARMACY COURSE.—An excellent course in Pharmacy, embracing practical laboratory work, is presented and is well patronized.

## CULTURE COURSES.

THE ANCIENT CLASSICAL COURSE.—This course has demonstrated its merits through the experience of the ages and has so many warm friends and stalwart advocates that it needs no commendation here. It is a course in which Greek, Latin and mathematics form the chief agents of culture.

THE MODERN CLASSICAL COURSE.—In this, German, French and other modern languages are substituted for Greek, and thereby the gates are open to the intellectual treasures stored in the European languages, and the means of intercourse with the great peoples of the Continent afforded.

THE ENGLISH COURSE.—This is a comparatively new course, in which, while foreign and ancient languages are offered, the chief emphasis is laid upon our own tongue, the richness and disciplinary powers of which are often overlooked in our admiration of other great languages.

In all these courses mathematics holds a high place, and considerable attention is given to the various physical sciences. Through the electives offered the ratio of these may be largely increased.

THE GENERAL SCIENCE COURSE.—In this the leading place is taken by the natural sciences, embracing chemistry, natural philosophy, physiology, biology, zoology, botany, astronomy, mineralogy, geology and kindred branches, the value of which needs no advocacy in these days of extraordinary utilization of science. With these are also offered extended courses in higher mathematics and the modern languages, especially German and French.

The foregoing are general culture courses intended to give a broad and liberal education while differing somewhat in their chief tendencies. All afford a wide range of study, rich in knowledge and discipline. The three following courses have been introduced during the past year with a view to adapting this general culture to professional courses in medicine, law, journalism and teaching:

THE PRE-MEDICAL COURSE.—In response to a request from the Wisconsin State Medical Society, the University offers a special course in science adapted to those comtemplating the study of medicine and surgery. It embraces long thorough courses in chemistry, physics. anatomy, histology, zoology, botany and kindred branches, which are intended to give a broad and solid foundation for the professional medical course, while at the same time they give a due measure of collegiate culture.

THE PRE-LEGAL AND PRE-JOURNALISTIC COURSES.—For the accommodation of those contemplating the study of law or journalism, extended courses in civil polity, economics and historical science, together with literary and philosophical branches, have been arranged so as to constitute the work of the Junior and Senior years of the collegiate course. Students are thus enabled to profit by an adaptation of their college course to their future work without essential deviation from the general purposes of collegiate training.

SPECIAL COURSES FOR NORMAL SCHOOL GRADUATES.—To afford graduates of the State Normal Schools facilities for extending their studies advantageously, and at the same time to attain a recognized standing leading to a degree, without loss of time or inconvenience arising from the want of adjustment of their previous studies to the standard college courses, special courses have been adopted by the University by which two additional years of successful study will enable graduates from the advanced Normal courses to graduate from the University with a degree.

GENERAL FACILITIES.—The Faculty embraces upwards of fifty instructors. The laboratories are new, extensive and well equipped, embracing the chemical, physical, metallurgical, mineralogical, geological, zoological, botanical, civil and mechanical engineering, agricultural and pharmaceutical laboratories. *Seminars* for advanced study in history, language, literature, mathematics, and other branches are being developed.

The libraries accessible to students embrace that of the University, 16,000 volumes; of the State Historical Society, 123,000 volumes; of the State Law Department, 20,000 volumes; of the City, 9,000 volumes, besides special professional and technical libraries, thus affording very exceptional opportunities for reading and special research.

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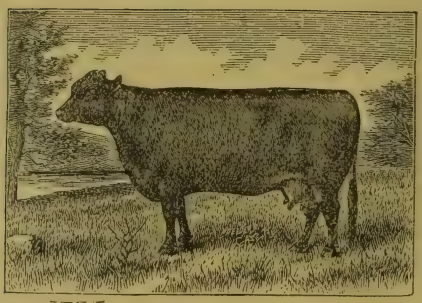
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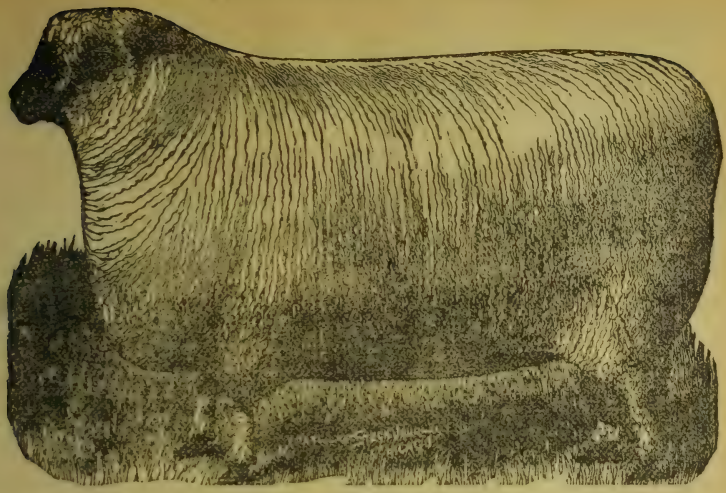
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# SHORT HORN CATTLE.

Of the blocky, short-legged sort. Form and abiilty to suckle two good calves without extra feed for the calves is our criterion, pedigree next. At the head of our herd stands DEGRAFF'S SURMISE, a son of the celebrated imported BARON SURMISE, bred by A. Cruickshank, of Scotland.

Our stock is not pampered up for show, nor kept in expensive barns, and we can therefore sell for half the money asked by other breeders.

GOOD, PURE BRED BULLS, $50.

Correspondence Solicited. Send for Catalogue.

**A. O. FOX, Oregon, Dane County, Wis.**

# Woodside Stud

—OF—

# FRENCH COACH HORSES

Will always be found to contain a choice selection of young stallions from the best breeding establishments of France.

**HIGH QUALITY,** Rather than Numbers, is **OUR MOTTO.**

IN WOODSIDE STUD ARE THE

First Prize and Second Prize Winners in the Four-Year old Stallion Clsss at the Great Horse Show of 1888.

At the Minnesota State Fair, held at St. Paul, September, 1889, WOODSIDE STUD won 1st and 2d prizes on stallions 4 years old; 1st and 2d on stallions 3 years old; 1st on stallion 2 years old; 1st on stallion 1 year old; also grand sweepstakes for the best Coach Horse, any age.

At the Wisconsin State Fair, WOODSIDE STUD also won 1st and 2d prizes on 4-year old stallions; 1st prize on stallions 3 years old; 1st prize on stallions 2 years old; 1st prize on stallions 1 year old.

## WOODSIDE COACHERS ARE OF LARGE SIZE,

**Weighing 1300 to 1500 lbs. at 4 Years Old,**

**WITH PLENTY OF CLEAN, FLAT BONE, SOLID COLORS, AND THE BEST OF STYLE AND ACTION.**

## PRICES LOW, TERMS EASY.

Every Animal Guaranteed a Breeder.

**CORRESPONDENCE SOLICITED. SEND FOR CATALOGUE.**

## A. O. FOX, Oregon, Dane Co., Wis.

"WOODSIDE FARM."




**French Coach Stallion GODFREY (152),** 16½ hands high, weight 1500 pounds.
PROPERTY OF A. O. FOX, WOODSIDE FARM, OREGON, WIS.

# WOODSIDE STUD

—OF—

## Large, Stylish, Standard-Bred

# TROTTING HORSES,

Comprising the choicest families of

**HAMBLETONIAN, MAMBRINO,**

And other strains of blood, notably,

**GEO. WILKES, ALMONT, PILOT, JR., MAMBRINO PATCHEN, AND CLAY PILOT AND HILL'S VT. BLACK HAWK.**

*Our great aim is size and style, backed by rich, standard inheritance. Size ranging from 15 1-2 to 16 1-4 hands; weight from 1,200 to 1,300 pounds.*

## PRINCIPALLY SOLID COLORS.

**Stallions, Stud Colts, Fillies, Brood Mares,**

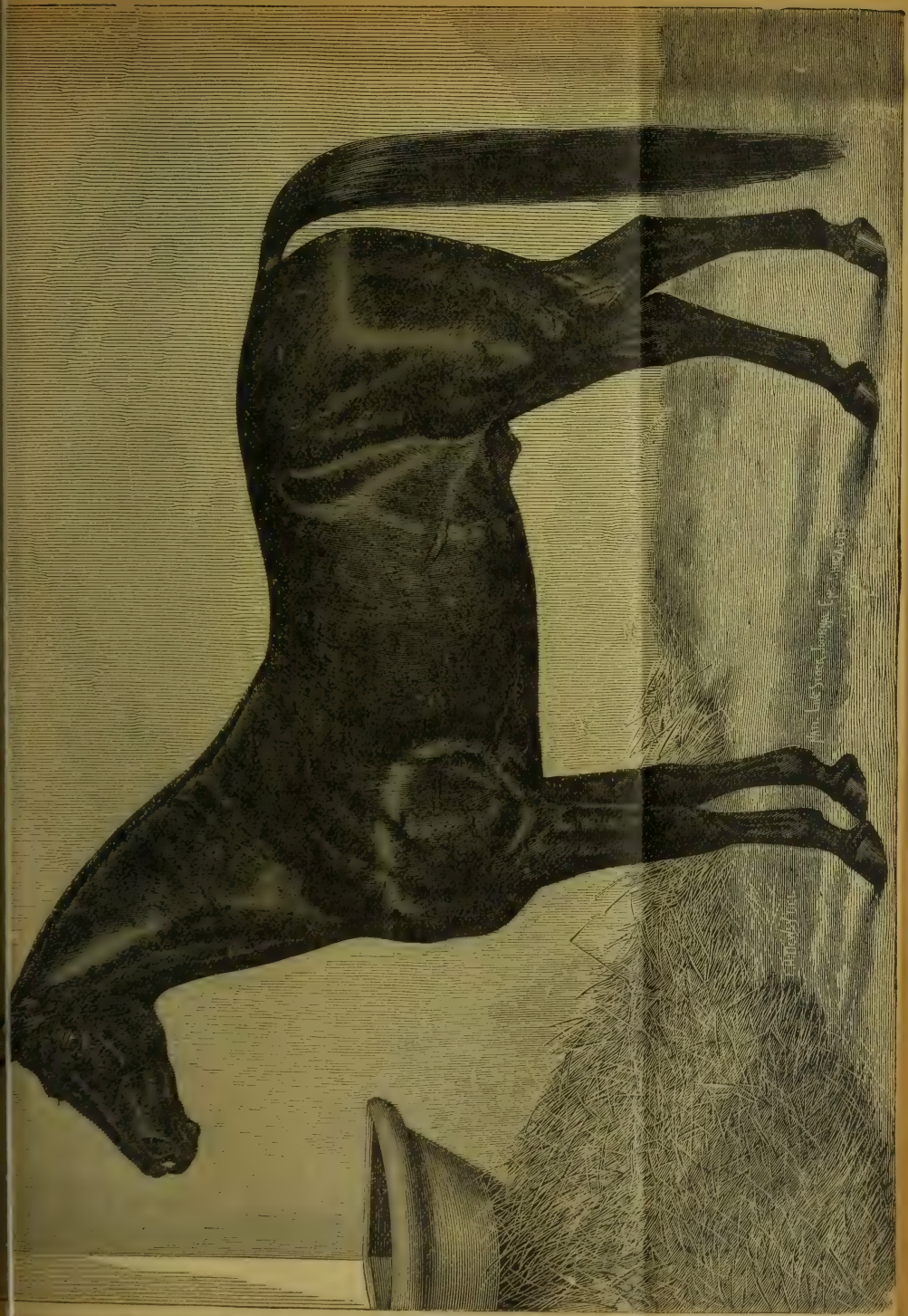
FOR SALE AT VERY POPULAR LOW RATES.

All stock guaranteed and registered free of charge to purchaser. Elegant tabulated pedigrees, suitably framed, furnished with every stallion. Special inducements to parties buying for track work. **Seventy-five head on hand.** Come and get your pick at our popular low prices and easy terms. Correspondence solicited. **Send for Catalogue.**

## A. O. FOX,

**Oregon, Dane Co., Wis.**

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Standard Trottin -Bred Stallion **WILCAN 6765.** Bay; 16½ hands: weight, 1300 pounds.
PROPERTY OF A. O. FOX, OREGON, DANE COUNTY, WIS.

# THE WESTERN FARMER

A JOURNAL OF PROGRESSIVE AGRICULTURE

Devoted to the Improvement of the Farm, the Dairy, Live Stock, etc.

Eighth Year. Madison, Wis., Nov. 2, 1889. Vol. VIII--No. 409.

PUBLISHED WEEKLY BY

**The Western Farmer Co.**

EDITORS:

FRANK H. WILLARD. } *No. 8, Democrat Block,*
W. H. MORRISON. } MADISON, WIS.

**Subscription Price, - - $1.00.**
**Advertising Rates 15c. per agate line.**


## The Western Farmer.

### What Farmers Think of It.

**A Success.**—"Send the WESTERN FARMER as usual. You have made a success never before attained in Wisconsin by an agricultural paper."

D. S. SMITH.
*Palmyra, Wis.*

**Best in Wisconsin.**—"I consider the WESTERN FARMER, at present, the best agricultural paper we have ever had in Wisconsin, and one of the best in the Union."

*Fond du Lac, Wis.* CHAS. L. HOYT.

**A Welcome Visitor.**—"Your valuable journal has become a very welcome visitor at my office. The information farmers can glean from its pages is worth many times the price of subscription."

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**A First-class Paper.**—"The WESTERN FARMER is a first-class agricultural paper—one which is of great value to the farmers of this State."—*Arcadia Republican-Leader.*

**Ably Edited.**—"The WESTERN FARMER is a most interesting and ably edited agricultural paper. It is one of the best sources of information and instruction within the reach of the farmers of Wisconsin."—*River Falls Journal.*

**In the Front Rank.**—"The WESTERN FARMER is rapidly taking rank as one of the leading agricultural papers of the country. Some of the foremost farmers of the Northwest contribute to its columns each week."—*Lake Mills Leader.*



BRILLIANT 1271 (755).

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**Brings Buyers.**—"A card in the WESTERN FARMER brings buyers."

*Oregon, Wis.* J. C. KISER.

**How to Make Sales.**—"We make more sales from our advertisements in the WESTERN FARMER than from any other paper."

P. WAKEM,
*Madison, Wis.* *Manager W. H. Jacobs' Herd of Shorthorns.*

**How to Reach Buyers.**—"Our advertisement in the WESTERN FARMER has brought us more answers than any other advertisement we have, and it brings us the best class of customers—men who want first-class stock and are willing to pay a fair price for it." STILSON BROS.

*Oshkosh, Wis.*


**TAKE NOTICE.—The WESTERN FARMER is the official organ of the WISCONSIN FARMERS' INSTITUTES; the best journal of its class in the State; the best advertising medium. Sample copies free.**

*Address Western Farmer Co. - Madison Wis.*

# WATCHES

Clocks —AND— Silver-Ware,




Dia-monds —AND— Jewelry

——SPECIAL STATE AGENTS FOR THE JUSTLY CELEBRATED——

## Dueber and Hampden Watches.

The Greatest Variety of Honest Goods at Reasonable Prices Kept in Wisconsin.

Send to Us for Prices on Anything You Want at either Wholesale or Retail.

## Manufacturing and Repairing

A SPECIALTY WITH US.

## O. L. Rosenkranz & Thatcher Co.,

100 WISCONSIN STREET,

MILWAUKEE, - WISCONSIN.

☞ *Mention "Farmers' Institute Bulletin" when Writing to Advertisers.*

# A Great Railway.

The Chicago, Milwaukee & St. Paul Railway Company now owns and operates fifty-six hundred and seventy-five miles of thoroughly equipped road in Illinois, Wisconsin, Minnesota, Iowa, Missouri and Dakota. Each recurring year its lines are extended in all directions to meet the necessities of the rapidly populating sections of country west, northwest and southwest of Chicago, and to furnish a market for the products of the greatest agricultural and stock raising districts of the world. In Illinois it operates 316 miles of track, in Wisconsin 1,309 miles; in Iowa 1,572 miles; in Minnesota 1,122 miles; in Dakota 1,216 miles; in Missouri 140 miles, and the end is not yet. It has terminals in such large cities as Chicago, Milwaukee, La Crosse, St. Paul, Minneapolis, Fargo, Sioux City, Council Bluffs, Omaha and Kansas City and St. Joseph, Mo., and along its lines are hundreds of large and small thriving cities, towns and villages. Manufacturing interests are cultivated, and all branches of trade find encouragement. The Railway Company has a just appreciation of the value of its patrons, and its magnificent earnings are the result of the good business tact which characterizes the management of its affairs.

The popularity of the line is attested by the fact that notwithstanding the strongest kind of competition of old and new lines, the Chicago, Milwaukee & St. Paul Railway continues to carry the greater portion of all the business between Chicago, Milwaukee, St. Paul and Minneapolis. It is the best patronized route between Chicago, Council Bluffs and Omaha and to and from all points in Wisconsin, Minnesota, Dakota and Iowa, and its Kansas City and St. Joseph line will undoubtedly take equal rank with the older lines leading to and from the Southwest.

On all its through lines of travel the Chicago, Milwaukee & St. Paul Railway runs the most perfectly equipped trains of Sleeping, Parlor and Dining Cars and Coaches. The through trains on all its lines are systematically heated by steam. No effort is spared to furnish the best accommodations for the least money, and, in addition, patrons of the road are sure of courteous treatment from its employes.

# Cheap Homes

## Along the Extensions of the C., M. & St. P. R'y, on Easy Terms.

The Chicago, Milwaukee & St. Paul Railway Co. has recently built hundreds of miles of new road in Iowa, Missouri, Wisconsin and Dakota.

Along these new extensions numerous towns are springing up which promise to become prosperous inland cities within a few years.

At a meeting of the Board of Directors, held in June, 1886, a resolution was adopted directing that, "hereafter, when towns are to be laid out along the Company's lines, the Company through its land department, shall purchase and plat the town sites and sell the lots."

In pursuance of this, the Land Department platted and is now offering lots for sale in these towns at low prices and on easy terms. As will be readily understood, the Company is thus enabled to sell them at less than one-half of what they would cost if in the hands of private speculators. All these towns are in the centers of prosperous farming communities, and are sure to grow rapidly. In all of them merchants find profitable investments, while mechanics and all classes of labor obtain ready employment.

*The Company owns land adjoining most of these town sites, and also has land grants in Iowa, Minnesota and Wisconsin, which lands are also for sale on reasonable terms.*

For plats, descriptions, prices and other information, address,

**C. A. PADLEY,**
or *General Land Agent,*
**H. G. HAUGAN,**
*Land Commissioner,*
MILWAUKEE, WISCONSIN.

The following is a list of towns, classified by States:

### WISCONSIN.

Courtland (Irma), Tomahawk, Minocqua.

### MINNESOTA.

Mapleton, Minnesota Lake, Okabena.

### DAKOTA.

Ramona, Oldham, Erwin, Bryant, Naples, Elrod, Bradley, Garden City, Butler, Burton, Langford, Britton,

Newark, Brampton, Sargent, Harlem, Monango, Edgeley, Orient, Millard, Hosmer, Hillsview, Eureka, Eden.

### IOWA.

Covington, Atkins, Newhall, Van Horne, Keystone, Vining, Gladsone, Ferguson, Haverhill,

Melbourne, Collins, Maxwell, Huxley, Woodward, Jamaica, Bagley, Bayard, Dedham,

Templeton, Aspinwall, Manilla, Astor, Earling, Panama, Portsmouth, Persia, Buck Grove,

Bell, Kenwood, Charter Oak, Ute, Rodney, Charles City, Peru, Cedar Rapids, Highland Center.

### MISSOURI.

Powersville, Lucerne, Harris, Osgood, Laredo, Ludlow, Braymer, Cowgill, Elmira, Mosby.




**Fast Mail Line** with Vestibuled Trains between Chicago, Milwaukee, St. Paul and Minneapolis.

**Trans-Continental Route** between Chicago, Council Bluffs, Omaha, St. Paul and the Pacific Coast.

**Great National Route** between Chicago, Kansas City and St. Joseph, Mo.

**5700 Miles of Road** reaching all principal points in Illinois, Wisconsin, Minnesota, Iowa, Missouri and Dakota.

*For maps, time tables,* rates of passage and freight, etc., apply to the nearest station agent of the CHICAGO, MILWAUKEE & ST. PAUL RAILWAY, or to any Railroad Agent anywhere in the World.

ROSWELL MILLER, General Manager.

A. V. H. CARPENTER, Gen'l Pass. and Tkt. Agt.

☞For information in reference to Lands and Towns owned by the CHICAGO, MILWAUKEE & ST. PAUL RAILWAY COMPANY, write to H. G. HAUGAN, Land Commissioner, Milwaukee, Wisconsin.

# W. K. STAFFORD & CO.,

414, 416 Milwaukee St.,

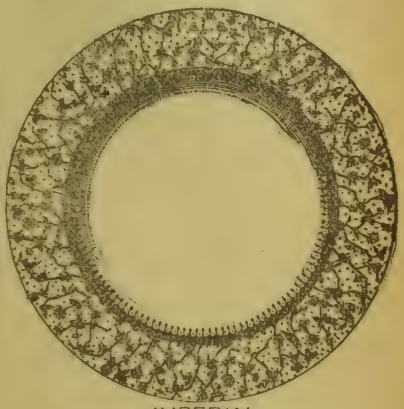
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IMPORTER OF

CHINA, POTTERY, GLASS AND LAMPS.



FINEST STOCK OF Staple and Fancy Crockery IN THE NORTHWEST.



IMPERIAL.

DINNER SETS IN OPEN STOCK.

Our Great Specialty.

Latest productions in TEA SETS, TOILET SETS, COURSE SETS, GLASSWARE, HANGING AND TABLE LAMPS. ROCHESTER LAMPS in great variety, at lowest prices.

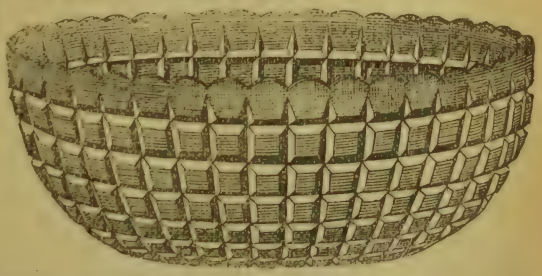
PIANO, or FLOOR LAMPS,

Over 40 beautiful patterns in stock, from $10 upwards.

HOTEL AND RESTAURANT GOODS OF ALL KINDS.

CALL AND SEE US WHEN IN MILWAUKEE.

Prices Guaranteed THE LOWEST in the City.



# Fond du Lac Guernsey Herd



My herd consists of sixty-five Registered Guernseys, which have been carefully selected from the best milk and butter strains on the Island of Guernsey and in America.

At the head of my herd stands the noted bull,

## "THE PRINCE 2D"

755, A. G. C. C.,

Out of Imp. Coraline 1790, A. G. C. C., that made eighteen pounds of butter in seven days on grass, and TRICK, 1656, A. G. C. C., out of Imp. Tricksey, 1760, A. G. C. C.

---

Among the cows are descendants of the noted Island Prize Winners,

*SQUIRE OF LES VAUXBELETS, FAIR LAD, THE BILLEY'S HERALD, AND JESSIE OF LESTER MANOR.*

---

## YOUNG STOCK OF BOTH SEXES FOR SALE,

From Imported and Home-Bred Stock, at Reasonable Prices.

All questions cheerfully answered. Visitors carried to the farm free of charge.

---

BREEDER OF REGISTERED POLAND-CHINA SWINE.

---

A Few Half-Blood Guernsey Calves, from Good Grade Cows, for Sale.

## W. I. HAMILTON, Fond du Lac, Wis.

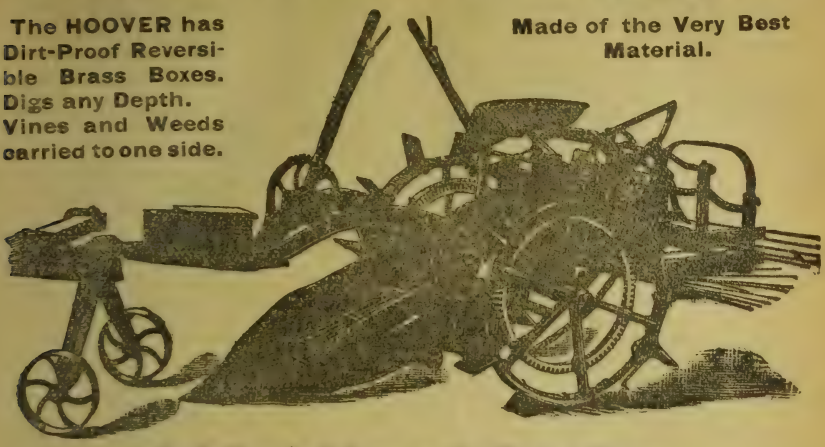
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# The Hoover Digger.

**The HOOVER has Dirt-Proof Reversible Brass Boxes. Digs any Depth. Vines and Weeds carried to one side.**

**Made of the Very Best Material.**



### T. B. Terry's Tribute to the Hoover Digger.

I want to say to my friends who read this that I have used an elevator digger for five years, and that the Hoover, which I consider the best, the past season, and that it is just as necessary a tool on my farm, and almost as perfect, as the mower or binder. My son and myself and three pickers dug and put in the barn as high as 400 bushels in a day this year.

*Hudson, O., Oct.* 9, 1889. T. B. TERRY.

---

### From Hon. Matt. Anderson—A Good Word for the Sorter.

MESSRS. HOOVER & PROUT: PINE BLUFF, WIS., Dec. 27, 1888.

GENTS—I have used your Digger in digging 30 acres of potatoes. It does its work well, where the ground is level and in proper condition. The Sorter is a great labor-saving machine.

Yours truly, MATT. ANDERSON.

(Mr. Anderson should have used our Side-Hill Spurs for his hilly ground.—H. & P.)

---

### 140 Plus 200 = 340 Acres for One Machine.

HOOVER & PROUT: Oct. 1st, 1889.

GENTS—Our old digger has turned off 100 acres this season (it dug 140 acres last year) and it has 100 acres more before it, if weather holds good. I dug to-day in 5¾ hours, 1,066 bushels, and I would have given $20 bill if I had had crew enough to have picked up as fast as I dug, and I would have dug 2,000 bushels in 10 hours. Will dig 3,000 bushels this year.

*River Falls, Wis.* E. H. CURRIER.

---

### No Trouble From the Start.

AHNAPEE, WIS., Oct. 6th, 1889.

GENTS—The Digger is perfectly satisfactory in every respect. I have dug over 30 acres this season. My potatoes were planted fully eight inches deep. The Digger placed them all on top of the ground, and in a row not exceeding 12 inches wide, save a stray one here and there. The capacity of the Digger is only limited by the distance a team can walk. My team weighed less than 1,000 each. We had no trouble in operating the machine from the start.

Very truly yours, C. G. BOALT.

---

MESSRS. HOOVER & PROUT: RACINE, WIS., Oct. 10th, 1889.

GENTS—We have given the Hoover Potato Digger, bought of your agent, C. T. Williams, a full trial; it did its work well in both rough and weedy ground; have dug over 4,000 bushels with it: can highly recommend it above the McCallum for both its good work and strength, as we have tried both kinds.

Yours, PIPER BROS.

---

PERRYVILLE, WIS., Oct. 10, 1889.

The Hoover Digger I purchased of C. T. Williams, of Racine, has given the best of satisfaction. It is what I have been looking for for years. Have tried a number of others, but the Hoover has no equal. Have used it in weeds and all kinds of soils, having dug 20 acres for my neighbors, and they all say "bless the inventor." It is a complete machine in every respect.

A. L. CURTIS.

---

# KEYSTONE MACHINES.

## "KEYSTONE" DISC HARROW,

With or without Seeder Attachment, is the most popular, and has important features possessed by no other.

## "KEYSTONE" Corn Planters, Check Rowers, and Ensilage Drills

Are made in several styles. Can suit anyone.

## "KEYSTONE" HAY LOADER

Will put a ton of hay on a wagon in five minutes; also, green clover for ensilage.

## "KEYSTONE" HAY RAKES.

Our "Side Delivery" is new. Makes a continuous windrow around the field. Our "Easy Dump" has steel or wood wheels, pole or thills.

## "KEYSTONE" CORN HUSKER AND FODDER CUTTER,

A wonderful machine, and a success.

## "KEYSTONE" CORN SHELLERS,

ALL SIZES.

## "KEYSTONE" HORSE POWERS,

OVERHEAD AND DOWN.

## "KEYSTONE" CIDER MILLS,

TWO SIZES.

## SEND FOR OUR NEW CATALOGUE,

AND MENTION THIS BOOK.

## KEYSTONE MANUF'G CO.,

STERLING, ILL.

☞ *Mention "Farmers' Institute Bulletin" when writing to Advertisers.*

# SILOING GREEN CLOVER.

You know what hard work it is to pitch onto the wagon by hand the green clover, and maybe you are tempted to give up siloing clover on account of this killing work. This hard work is ended for those who use the

## "Keystone" Hay Loader,

Which proves itself a great success at this work, as it has for many years in the hay field.

### READ THIS:

ELKHORN, WIS., July 23, 1889.

*Keystone Manufacturing Co.:*

GENTLEMEN.—I have just completed the filling of my silo with green clover, and desire to acknowledge to you the great help we have had in the use of your invaluable Loader. In fact we should have been obliged to abandon it but for the Loader. No matter how green the clover, the Loader handles it equally well either in swath or windrow. I shall not attempt another haying without the use of your great labor saver. I am more than pleased with the Loader, and would not take double the cost if another could not be purchased.

Very respectfully,

ISAAC MOORHOUSE.

In the Hay Field too, you will find the Loader just as valuable.




It will pay you well to send for our Catalogue, which is sent free on application, and shows our large line of first-class machines. Address

**KEYSTONE M'F'G CO.,**

STERLING, ILL.

# 175---SHORTHORNS---175

## W. H. JACOBS, MADISON, WIS.,




IMPORTER AND BREEDER OF

# Shorthorn Cattle and Berkshire Hogs.

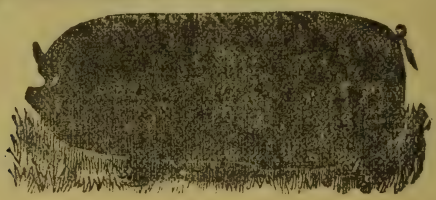
**Animals of Each Breed and Both Sexes for Sale at Reasonable Prices at All Times.**

My herd won at the **Iowa State Fair, Minnesota State Fair, Wisconsin State Fair and Dane County Fair**

# FORTY-FOUR PRIZES,

**Nine of them being SWEEPSTAKES,** four of them being for herd bred and owned by exhibitor. I bred all females shown by me this year. I have now **Thirty-five Young Bulls,** most of them ready for service and many of them prize winners.

☞**SEND FOR CATALOGUE OF BULLS.**



—I HAVE ALSO—

## A FEW CHOICE YOUNG REGISTERED BOARS READY TO SHIP,

**And will be Sold Cheap, Quality Considered.** Address

## W. H. JACOBS, MADISON, WIS.,

**Or apply to P. WAKEM, MANAGER, at Farm, Burke Station, 5 miles from Madison on Watertown Division of C., M. & St. P. R. R.**

☞**Ample Time Given to Responsible Parties Wanting Time.**

---



The above illustration, reproduced from photograph, shows Mr. Geo. A. Austin in his field o Ensilage corn, raised from "B. & W." seed furnished by Cornish, Curtis & Greene, of Fort Atkin son, Wisconsin, general western agents. Write for circulars.

The average yield of twenty acres, after wilting and curing from two to ten days, was 1 13-100 tons per acre, and the cost of plowing, planting seed, cultivating, cutting and putting into silo was at the rate of $12.27 per acre, or less than 64 cents per ton.

**Be Sure and Get the Genuine B. & W. Take no Other**—10,000 bu. sold last year.

CORNISH, CURTIS & GREENE, Fort Atkinson, Wisconsin,

Manufacturers and dealers in everything pertaining to Butter and Cheese Making. Send for Prices and **Discounts.**

SILVER SPRINGS HERD

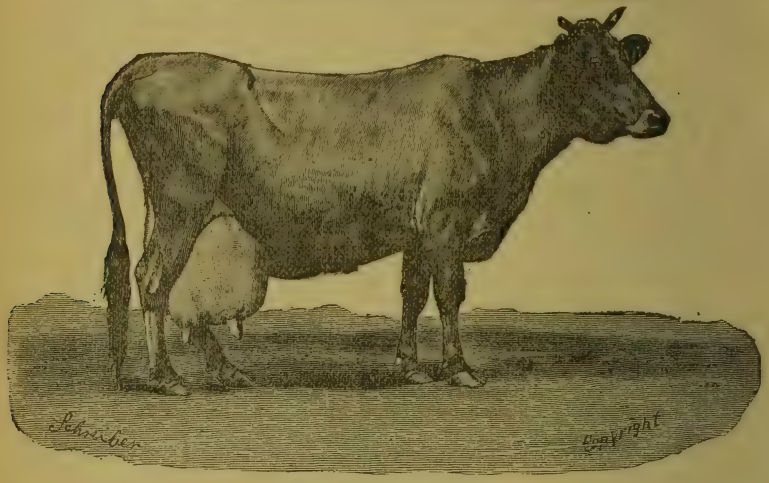
# JERSEY CATTLE.

The foundation of this herd was selected with great care, only animals of great dairy merit were admitted. No color foolishness was allowed to prejudice us in making selections. The five cows purchased were good for an annual average of 500 pounds of butter each. The herd is headed by the two

## PRIZE AND SWEEPSTAKES BULLS,

# JUMBO OF RIVERSIDE,

SIRED BY **PEDRO,** A SON OF THE GREAT




## EUROTAS,

AND OUT OF A GRAND-DAUGHTER OF JERSEY BELLE OF SCITUATE; AND

# FAITH'S PRINCE POGIS,

Sired by the only son of the famous **MARY ANNE** of St. Lambert, and out of

FAITH OF OAKLANDS,

——SWEEPSTAKES COW OVER ALL CANADA.——

The aggregate weekly butter record of the dam and sire's dam of **FAITH'S PRINCE POGIS** is over 54 pounds.

These two bulls individually have no superiors and but few, if any, equals. They are large, symmetrical, vigorous, muscular and strong in constitution. Their breeding combines the blood of the great cows:

JERSEY BELLE OF SCITUATE, 705 pounds of butter in a year; EUROTAS, 778 pounds of butter in a year; MARY ANNE OF ST. LAMBERT, 876 pounds of butter in a year; FAITH OF OAKLANDS, 17 pounds, 4 ounces of butter in a week, 9,265 pounds of milk in 365 days.

Stock is the very best; not overfed or "doctored," and always gives satisfaction.

## T. L. HACKER, Madison, Wis.

# T. L. KELLY & CO.,

89 & 91 Wisconsin St., and 385 Broadway, Milwaukee.

# DRY GOODS.

The greatest variety of useful goods, the best arranged departments, and

## The Lowest Prices in the State.

Dress Goods, Silks, Velvets, Cloaks, Shawls, Flannels, Blankets, Merino and All Wool Underwear, Ladies' and Children's Muslin Underwear, Hosiery, Gloves, Corsets, Laces, Ribbons, Trimmings, Dress Buttons, Handkerchiefs, Prints, Ginghams, Gents' Furnishing Goods, House Furnishing Goods, Etc., Etc.

## SAMPLES SENT ON APPLICATION.

Goods ordered and left to our judgment to select, may be returned by express at our expense if not satisfactory, if returned immediately and in good order, and other goods will be sent in exchange or the money refunded, as the customer may desire.

---

Every Lady Visiting our Store Should go through and Examine our

## House Furnishing Department.

She will there find hundreds of useful things for the

## KITCHEN AND DINING-ROOM,

That she had never thought of, or had neglected to purchase, and which she will not be without when she sees them and realizes their usefulness and ascertains the Low Prices at which we are selling them.

**A VISIT TO OUR ESTABLISHMENT WILL BE INTERESTING AND PROFITABLE TO YOU.**

## T. L. KELLY & CO.

☞ *Mention "Farmers' Institute Bulletin," when Writing to Advertisers.*

THE CELEBRATED ROSS ENSILAGE and FODDER CUTTERS and CARRIERS.
Tread Powers and Sweep Powers.
THE FINEST AND LARGEST LINE OF
SPECIAL
FODDER AND ENSILAGE CUTTING MACHINERY
IN THE WORLD.




Better made, stronger, more durable, and will cut faster with less power than any other Cutter manufactured. Liberal inducements to agents and dealers. Send for our large Illustrated Catatogue, and 10 cents in stamps for our 160-page book of Practical Information on Ensilage, and Building of Silos. Address

**E. W. ROSS & CO.,**

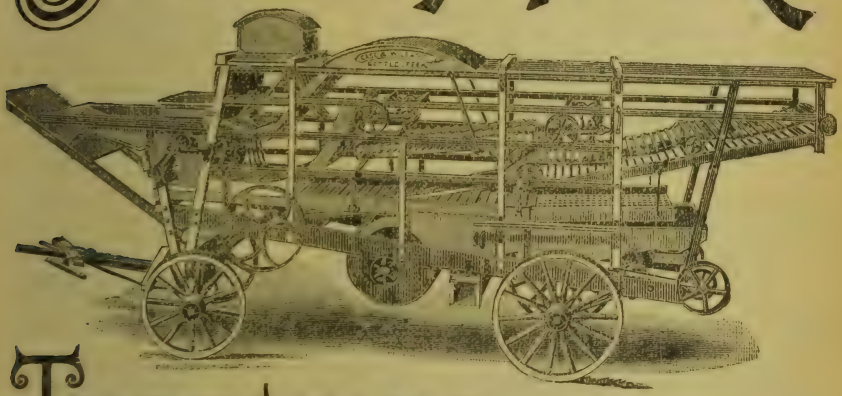
Manufacturers, SPRINGFIELD, O., U. S. A.



THE LATEST.

THE BEST.

# ADVANCE



# THRESHING MACHINERY.

MANUFACTURED BY

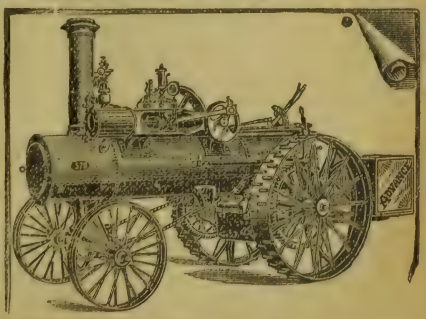
Advance Thresher Co.,

BATTLE CREEK, MICH.

For Pamphlets and full particulars, address

E. H. HEATH,

Madison, Wis.



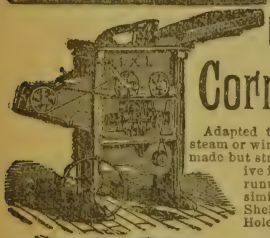
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Shelling and Grinding at home, saving tolls and teaming to and from the Grist Mill. This work can be done rainy, windy days when out-door work is suspended on the farm. The same Mill will cut corn stalks, saw wood, run churn, grindstone, pump water, etc. We make the HALLADAY Geared Wind Mill in 11 sizes, 1½ to 40 horse power, and GUARANTEE they have no equal for Power Durability and Storm Defying qualities.

34 Years Experience.





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Adapted to run by hand, horse, steam or wind power. Not cheaply made but strong, durable and effective in its working yet light running. It is constructed similar to the large Power Shellers and is the best 2 Hole Sheller on the market.



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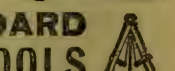
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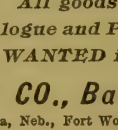




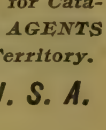
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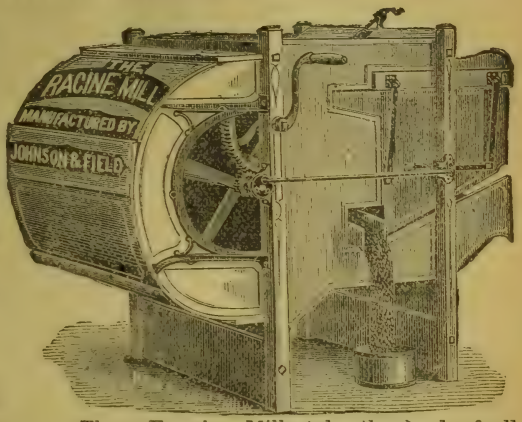
**Farm and Warehouse**

## Fanning Mills,

## Dustless Grain Separators,

AND

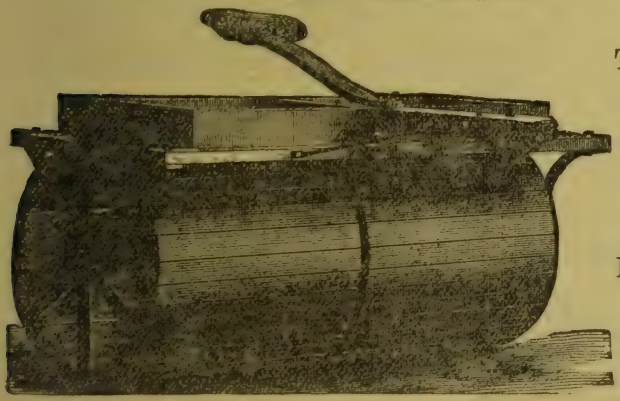
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Give them a trial, and if not satisfactory, no pay. Made in four different sizes and at reasonable prices.



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Large diameter, easy draft, made in four different lengths. Warranted to give satisfaction. Send for circulars and prices before you buy. Agents wanted. Address

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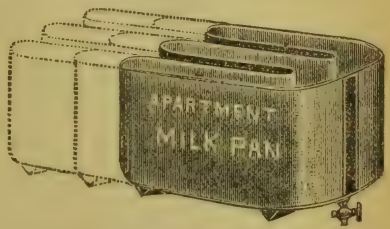
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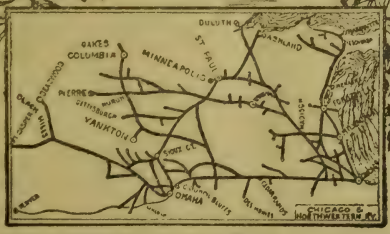
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Just think of cutting Three Rousing Crops a Year!

## The Way to Do It

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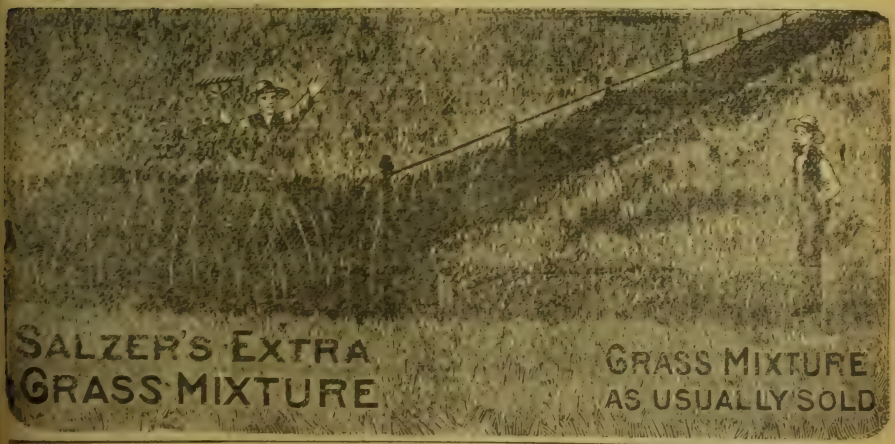
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## LEADS THEM ALL

### In Flavor and Evenness of Grain.

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There is no **butter, grease, chemicals,** or any other **foreign substances** used in its manufacture either to **purify, bleach** or **granulate** it, and we guarantee it to make a brine

CLEAR AS CRYSTAL

quicker than any other salt, without any milky appearance, or dirty suds, thus showing its freedom from **lime and dirt,** and it will not **cake up hard,** thus showing its freedom from Gypsum.

Dairy salt is put up in 280 lb. barrels, the staves of which are selected and planed on both sides, and in 28, 56, 112 and 224 lb. sacks. Table salt in 3, 5, 10 and 14 lb. pookets packed in barrels. **second quality** and **agricultural** salt in car load lots.

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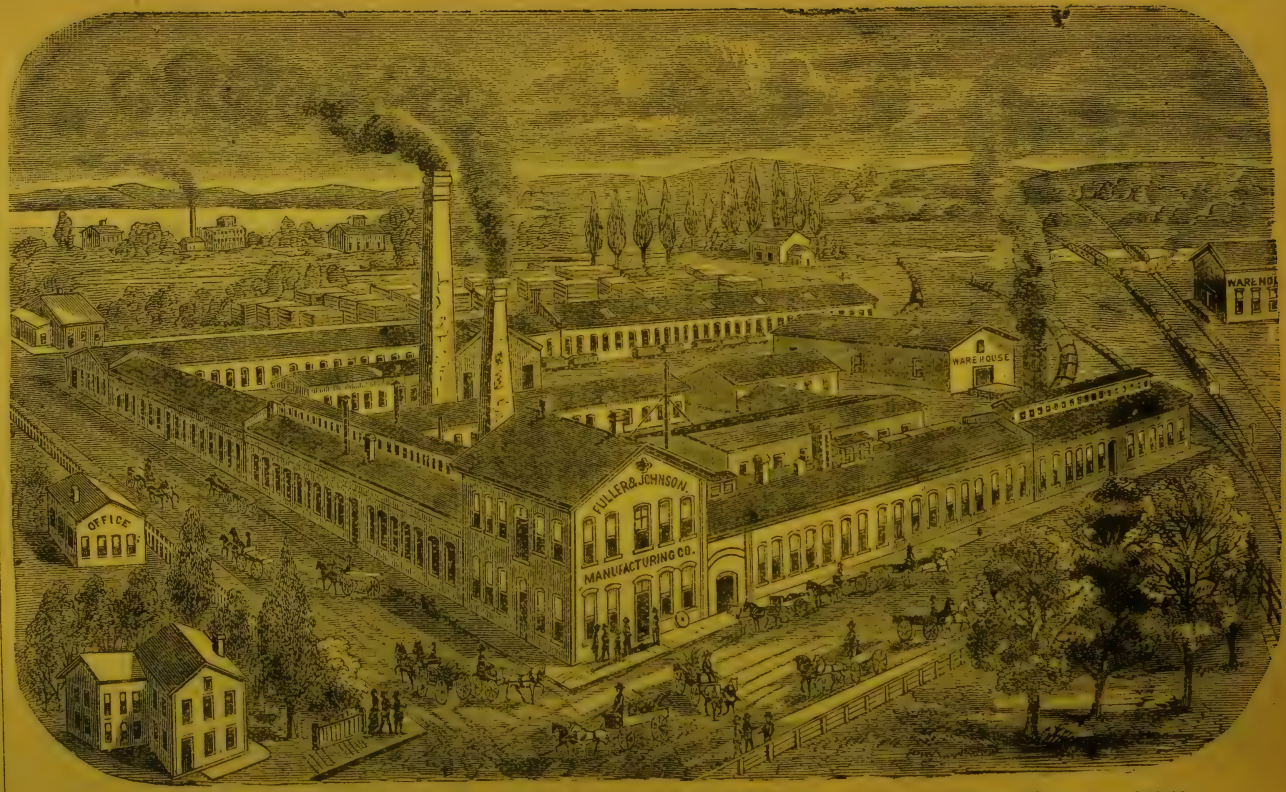
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Works of FULLER & JOHNSON MFG. CO., Madison, Wis.

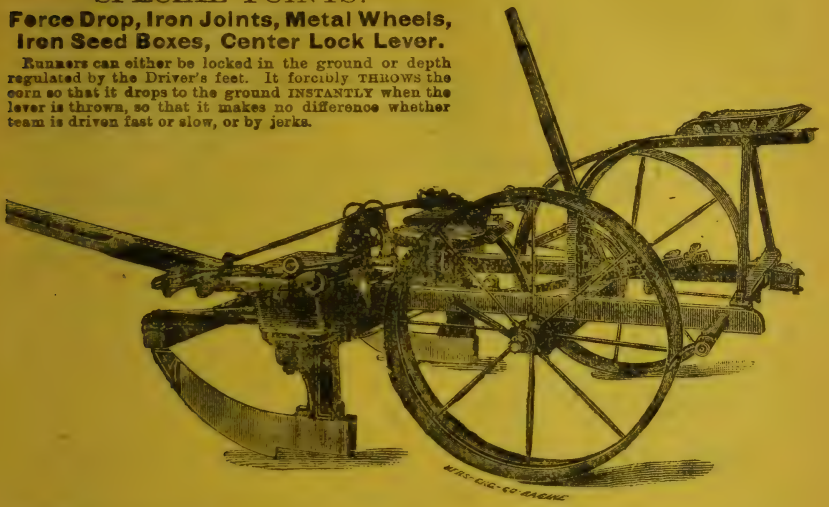
Manufacturers of Farm Implements, "Red, White and Blue" Mowers, Bonanza, Star, and Johnson Self-Dump Hay Rakes, Bonanza Force Drop Corn Planter and Check Rower, Plows, Cultivators, Harrows, etc. Write them for Illustrated Catalogue, which will be sent postage paid upon application. ☞ THEY HAVE A PERFECT MACHINE FOR PLANTING ENSILAGE CORN.

# Bonanza Force Drop Corn Planter and Check Rower.

SPECIAL POINTS:

**Force Drop, Iron Joints, Metal Wheels, Iron Seed Boxes, Center Lock Lever.**

Runners can either be locked in the ground or depth regulated by the Driver's feet. It forcibly THROWS the corn so that it drops to the ground INSTANTLY when the lever is thrown, so that it makes no difference whether team is driven fast or slow, or by jerks.



**The above cut shows our Bonanza Force Drop Corn Planter with our Improved Check Rower.**

Will plant corn in straight rows both ways, whether team goes fast or slow. This alone will save the price of Planter for every 100 acres planted, by not having corn destroyed by cultivating.

The operating slides rest on anti-friction rollers, so that the slide bar is much more easily operated,—a great saving of wear on the Check Rower,—which will therefore last much longer.

When raised out of the ground it is self-locking; thus avoiding the use of latches.

It has glass at the heel of the drop so that the driver can at all times see the corn dropping.

The lock being in the center, the runners go a uniform depth. Planters that lock at the side run deeper on one side than the other, when the Planter is locked in the ground.

## CHECK ROWER.

Made entirely of Iron and Steel. No wood frame across Planter. Great strength, easy movement. Only three working parts in center of Check Rower. Made adjustable for either our 3 ft. 6 or 3 ft. 8 Planter. Driver can throw off the wire at end of field without leaving his seat, by pulling the string attached to latch and hand lever. [See cut above.]

This Check Rower is of the very latest improvement, is adapted especially to our Force Drop Planter, and the two together make the very best outfit for planting corn to be found in the market. We defy any one to produce its equal.



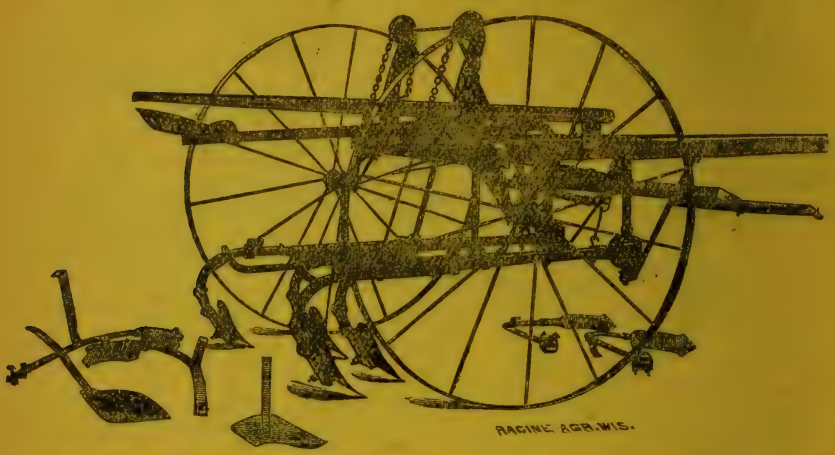
The accompanying cuts show the working parts of the Force Drop. The one at the left shows the manner in which the lever causes the seed cup to revolve and throw the corn to place. The center cut shows the seed cup in position with corn in cup, and also hill of corn that has just been dropped. The cut at the right shows the whole seed cup and lever, and also hill of corn just dropped.

**DRILL ATTACHMENT.**—An attachment is used for planting the corn in drills, and when it is to be planted for *Ensilage*, making it a perfect drill for this kind of work. Manufactured by

*FULLER & JOHNSON MFG CO., Madison, Wis.*

IMPROVED

# Bonanza Riding Cultivator.




## Steel or Wood Beams, High Arch, Steel Axle, Long Drag Bars.
## Can be Used with Four, Six or Eight Shovels.

### ADVANTAGES.

The axle is made adjustable for cultivating in wide or narrow rows.

Axle is *very high* so that it will not break down the corn. The draft is direct from axle, and is so attached that it can be raised up or down and whiffletrees fixed at any point that may be desired.

Drag bars are attached to standards so as to swing with the least possible friction. Beams and shovels are provided both with friction slip and break pin, to prevent any possible danger of breaking shovels. Shovels are extra hardened and will scour equal to anything that can be had. Shovels are attached so as to be adjustable in every way; can be given more curve or set straight; set to throw dirt to or from corn.

We furnish either foot lifts or springs. The hand levers are very convenient to the driver, and drag bars can be raised very easily. The seat is adjustable high or low, also forward and back, so as to balance the pole perfectly. Wheels are high, and are made with iron hubs and run on steel axles. The tires on wheels are bolted to felloes.

### SURFACE CULTIVATING.

These Cultivators are provided with shovels *plated and sharpened on upper end* so that when corn is well grown and there is danger of destroying roots by using pointed end of shovel and working deep in ground, the shovel may be reversed and the broad end of same worked in ground, which will destroy all weeds and grass, but will not go deep enough to destroy roots of corn. Few farmers fully realize the damage done to corn by deep cultivating after it is well grown and roots are much spread. Deep cultivating should be done while corn is small and before roots have spread.

Manufactured by

FULLER & JOHNSON MFG. CO.,
MADISON, WIS.

# The Modern Hero.



**Grind Your Grain, Cut Your Fodder, Saw Your Wood,**

WITH THE CELEBRATED

**Modern Hero Horse Power & Grinding Mill, Hero Fodder Cutter, and Common Sense Wood Saw,**

—AND—

## SAVE TIME AND MONEY.

You will find them economical, profitable and satisfactory Machines.

**We Make the Best Goods and always sell them on their Merits.**

**We are the Largest Manufacturers of Our Line in the World**

Send for our handsome Illustrated Catalogue giving full description of our twenty-six sizes American Mills, Hero Fodder Cutters, Badger Seeders, Horse Powers, Corn Shellers, Peck's Husking and Shelling Attachment for Fodder Cutters. ☞All goods fully warranted and sent on trial.

**Appleton Manufacturing Co.,**

APPLETON, WIS.

19 & 21 So. Canal St., Chicago, Ill.

St. Anthony Park, St. Paul, Minn.

# Money on the Farm.

## DOUBLE YOUR STOCK.

# Smalley's Ensilage Cutters

## STILL TAKE THE LEAD.




THE SMALLEY CUTTER, WITH IMPROVED BUCKET CARRIER. SMALLEY TREAD POWER WITH GOVERNOR.

SEND FOR OUR 1888 BOOK

# WHY IT PAYS.

## Ensilage and Fodder Cutting.

Practical views by such men as Hiram Smith, A. A. Arnold, F. C. Curtis, and D. F. Sayre & Sons.

See Next Page.

## The Smalley Manufacturing Co.,

MANITOWOC, WIS.

# Smalley Ensilage Cutters

## STILL AHEAD.

### Never Feeds any Uncut Fodder.

SHEBOYGAN FALLS, SHEBOYGAN CO., WIS., March 13, 1888.

SMALLEY MANUFACTURING CO.

*Gentlemen:*—I built a Silo in the summer of 1886, size forty by twenty-eight, and sixteen feet high, divided into three pits, capacity 270 tons, cost about $400; stands on stone foundation, the walls made of matched flooring and tar board paper. The building is used for grain barn, and threshing is done just before the corn is sufficiently matured for Ensilage, say large enough to make roasting ears, cost of cutting corn in field and cutting into Silo about fifty cents per ton. My success has been entirely satisfactory, and I shall build an addition this year with capacity of 125 tons more; it is the cheapest cow feed I ever raised. I feed one feed a day of dry corn fodder and barley straw mixed, run the dry fodder through the cutter, and on eight pounds of dry feed put four pounds of wheat middlings. Never feed uncut fodder. I have for the past two years used a No. 14 Cutter and twenty-four foot Carrier, manufactured by the Smalley Manufacturing Company, of Manitowoc, Wis., and like it very well. Yours truly,

HIRAM SMITH.

### Ex-President Arnold tells his Experience with Ensilage and Cutters.

GALESVILLE, TREMPEALEAU CO., WIS., March 12, 1888.

SMALLEY MANUFACTURING CO.

*Gentlemen:*—I built a Silo in 1887 in my barn; it is twelve by twenty-four, and twenty-eight feet deep, eight feet in the basement, and cost $130; holds 125 tons, and cost about $1 per ton for cutting and filling. Corn partly cured the best, corn well matured the best. When heated to 120 degrees, Ensilage is sweet and better than when filled too fast and not allowed to heat up. I consider a ration of from twenty to twenty-three pounds, twice a day, with dry fodder, the best ration in cold weather for the health of the cattle and the quality of the milk and butter. Fully matured corn from the field makes a good ration for fattening steers. I do not cut dry fodder at all. I use a Smalley No. 12 Cutter, and cut one ton in from fifteen to twenty minutes, one-half inch long, with an elevator. The elevator is like most of the machines, but I think it should be improved by use of rubber belts instead of chain.

ALEX. A. ARNOLD,
Ex-President Wisconsin State Agricultural Society.

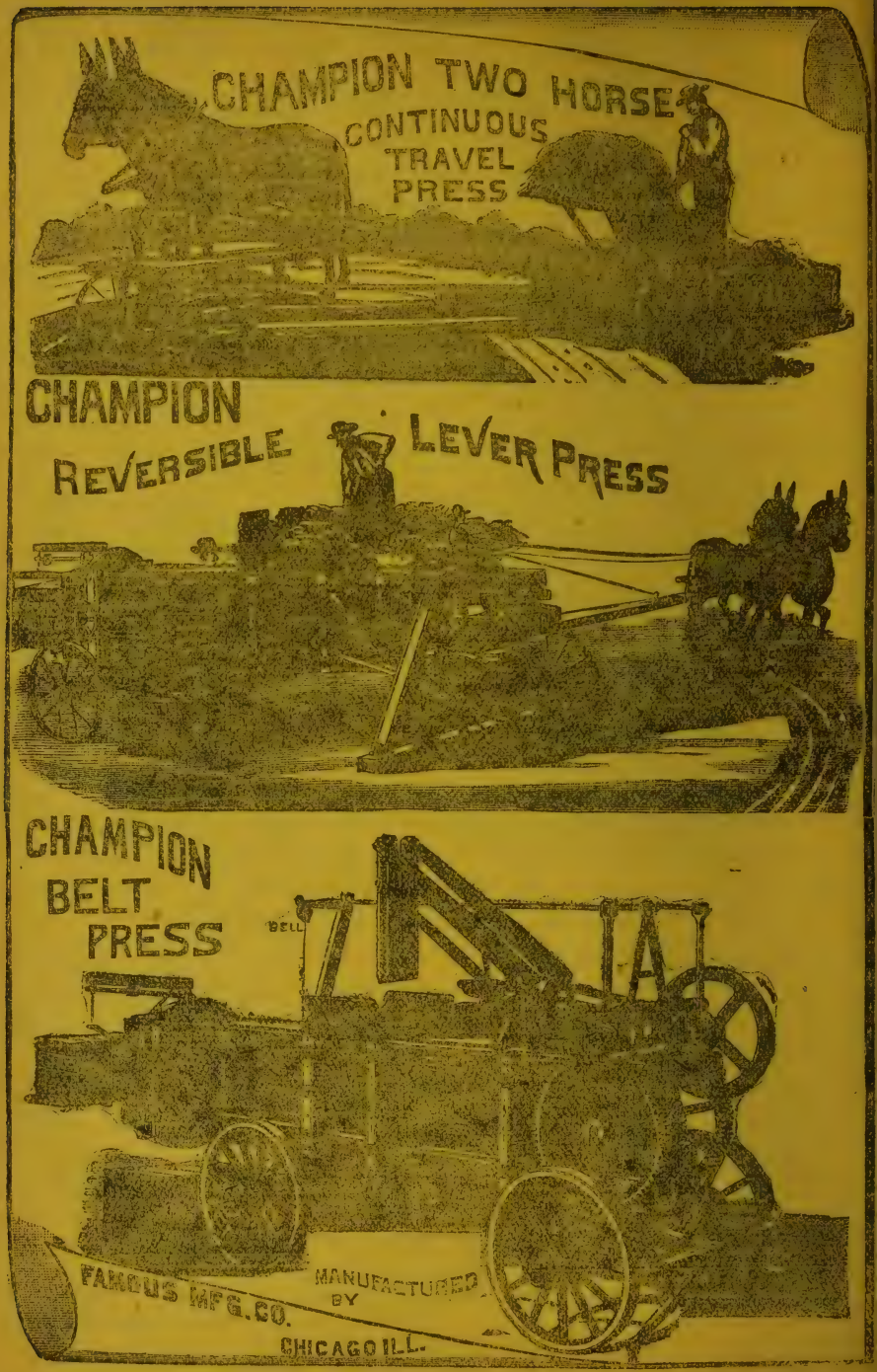
### Never Done Better at Butter-Making.

ROCKY RUN, COLUMBIA CO., WIS., March 10, 1888.

SMALLEY MANUFACTURING CO.

*Gentlemen:*—Having a large stone barn used a part of it for a Silo, and to give cost of same would be no criterion, having used it two seasons. I was the butt of ridicule the first season, but it proved so valuable that four of these ridiculing neighbors built Silos the last season, and all are pleased with the result. Six men and six horses, with two wagon trucks, a Smalley Four-horse power and Smalley No. 12 Cutter, put in about twenty tons a day. We used their Carriers, too, all of which worked complete. I have fed forty-five head of cattle on Ensilage once a day, and good straw twice a day, with about eight quarts of wheat mixed with bran, oats and corn meal, each with warmed water. The stock so fed looks better than it has for two years, and the cows never done better at butter-making. Shall increase my Silo capacity the coming season. F. C. CURTIS.

The Smalley Manufacturing Company, Manitowoc, Wis.




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# GENESEE SALT COMPANY.

MERCANTILE EXCHANGE, NEW YORK.




PRODUCE EXCHANGE, CHICAGO.

WORKS AT PIFFARD, N. Y.

Manufacturers of the Justly Celebrated

## Genesee Factory Filled Dairy Salt,

IN SPECIAL GRAINS FOR

## BUTTER, CHEESE AND TABLE USE.

The only Dairy Salt that does not lump, harden or gather moisture.

**THE BEST,** because it is
**THE PUREST,**
**THE DRYEST,**
**THE WHITEST,**
**THE STRONGEST,**
**And Most Uniform Salt in the World.**

**FREE FROM PAN SCALES.**

For season of 1886 and 1880, butter and cheese salted with Genesee Factory Filled Salt were awarded First Premiums at the

**WISCONSIN, IOWA, MINNESOTA AND NEBRASKA STATE FAIRS.**

Eight First and Four Second Premiums at the

AMERICAN FAT STOCK AND DAIRY SHOW.

First Premium at the Iowa State Dairymen's Association. Second Premium at the Wisconsin. Grand Sweepstakes at the Illinois. First Premium at the Michigan.

An Unprecedented Record by any salt in the history of Dairying.

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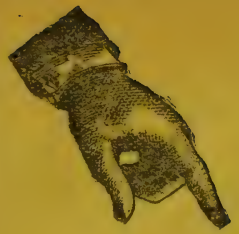
This salt is made from a natural flow of clear, fully saturated Brine; is in its natural crystal, and is not ground. It is now used by the

Largest Creameries and Cheese Factories in the Country.

---

**Samples, Price Lists and Testimonials Furnished on Application.**

☞ *Mention "Farmers' Institute Bulletin," when Writing to Advertisers.*





We advise farmers to send a postal card with address in full, and get circulars in reply, representing

# The Boss Harrows and Boss Pulverizers

Write your address plain and full, and direct the postal card to

The Boss Harrow Mfg. Co., Madison, Wis.

WE ADVISE THIS BECAUSE WE KNOW YOU NEED THIS CLASS OF GOODS





☞ Mention "Farmers' Institute Bulletin" when Writing to Advertisers.

# Vacuum Pan Dairy Salt

## LEADS THEM ALL

### In Flavor and Evenness of Grain.

PURITY




STRENGTH

## READ ITS RECORD.

At the late State Fair in Milwaukee, Butter and Cheese were judged by three expert judges from Chicago, and butter salted with **VACUUM PAN SALT** was awarded **TWELVE PREMIUMS** out of **SIXTEEN.** No butter or cheese exhibited scored higher than that salted with Vacuum Pan Salt. Vacuum Pan Dairy Salt has been awarded the **FIRST PREMIUM** (diploma) wherever exhibited.

This salt is **absolutely free** from **pan scale** and all **other gritty substances,** is not ground, does not **cake,** and contains no insoluable matter which is so annoying to the consumer and detrimental to the sale of butter.

There is no **butter, grease, chemicals,** or any other **foreign substances** used in its manufacture either to **purify, bleach** or **granulate** it, and we guarantee it to make a brine

CLEAR AS CRYSTAL

quicker than any other salt, without any milky appearance, or dirty suds, thus showing its freedom from **lime and dirt,** and it will not **cake up hard,** thus showing its freedom from Gypsum.

Dairy salt is put up in 280 lb. barrels, the staves of which are selected and planed on both sides, and in 28, 56, 112 and 224 lb. sacks. Table salt in 3, 5, 10 and 14 lb. pockets packed in barrels. **second quality** and **agricultural** salt in car load lots.

Ask your salt dealers and grocers for **Vacuum Pan Dairy** and **Table Salt,** and take no other. It is the **cheapest, purest, strongest** and **best salt in the world.**

REFERENCES.

A. R. Hoard, Fort Atkinson, Wis.; Marr & Kachel Bros., Whitewater, Wis.; C. B. McCunna, Burlington, Harris & West, Spring Prairie, Wis.; J. C. Flack, Elkhorn, Wis. Hon. Hiram Smith, Sheboygan Falls; H. K. Loomis, Asst. Dairy Commissioner.

## Butters & Peters Salt and Lumber Co.

R. M. BOYD, Agent, Racine, Wis.

# J. F. SWAB,

——GENERAL WESTERN AGENT——

## De Laval Separator Co.,

——MANUFACTURER AND DEALER IN

# Creamery & Dairy Supplies,

**ENGINES AND BOILERS, CREAM AND MILK VATS, WEIGH CANS.**

Teet's Chicago and New York Steel and Iron Clad Cans. J. F. Swab "Jacketed Refrigerator Cans," the best and cheapest can in the market. J. F. Swab "Ventilated Milk and Cream Cooler," acknowledged by the best judges as the leading invention. Thousands in use and giving the best of satisfaction.

**Revolving Box Churns, Butter Workers, Butter-Milk, Cream and Milk Strainers, Butter Cloth Circles, Tin and Acme Tub Clasps, De Laval Turbine Belt and Hand Separators.**

Complete outfits a specialty. Estimates furnished on short notice.

Factories, 8 & 10 North 1st St., Cedar Rapids, Ia.

Office, 3 Chicago St., Elgin, Ill.

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# GRASS SEEDS

TIMOTHY, CLOVERS, FLAX, HUNGARIAN, MILLETS, RED TOP, BLUE GRASS, LAWN GRASS, ORCHARD GRASS, BIRD SEEDS, ETC.

## POP CORN

We make a specialty of all kinds in large or small quantities.

# ENSILAGE CORN

ALL STANDARD VARIETIES, in car load lots or less.

**PLEASE CORRESPOND BEFORE BUYING.**

## FLAX SEED.

REFERENCES: First National Bank, Mercantile Agencies and Merchants generally

# PASTURE GRASSES

Permanent or Alternate Husbandry

# FOR ALL SOILS

PRICES ON APPLICATION.

# THE ALBERT DICKINSON CO.,

SEED MERCHANTS,

WAREHOUSES:
115, 117 & 119 Kinzie St.
104, 106, 108 & 110 Michigan St.
1600 to 1614 Clark St.

OFFICES, 115 KINZIE ST.,
CHICAGO, ILL.

# Creamery, Cheese Factory AND DAIRY MACHINERY and SUPPLIES

## D. H. ROE & CO.,

CHICAGO, ILL.,

CARRY A FULL LINE OF

## ALL KINDS OF SUPPLIES,

—SUCH AS—

Butter Cloth, Cheese Cloth, Cloth Circles, Rennets, Rennet Extract, Rennet Tablets, Cheese Color, Butter Color, Cheese Grease, Salt, Butter Tubs, Cheese Boxes, Cheese Box Stock, Etc., Etc.

ALSO, A FULL LINE OF

CREAM VATS, MILK VATS, SELF-HEATING VATS, CHURNS, STEAM BOILERS, STEAM ENGINES, SEPARATORS, CHEESE PRESSES, BUTTER PRINTERS, ETC.

Send for Price List, and Mention the Bulletin.

☞ *Mention "Farmers' Institute Bulletin," when Writing to Advertisers.*

# FARMERS!

SAVE MONEY BY BUYING FROM

## H. R. EAGLE & CO.,

68 Wabash Ave., Chicago.

Everything you Eat, Wear or Use,

—AT—

Wholesale Prices.

| | |
|---|---|
| John Clarke, Jr.'s, cotton thread, per spool | $ 03 |
| Kingsford's Silver Gloss Starch, per lb .. | 05 |
| Price's Baking Powder, per lb ..... | 32 |
| Church's "Arm and Hammer" soda, pr. lb | 03 |
| 25 lbs. Prunes for ..... ..... | 1 00 |
| 4 lbs. very fine Uncolored Japan Tea .... | 1 00 |
| 4 lbs. good Plug Tobacco for..... | 1 00 |
| 30 lbs. Rice for ..... | 1 00 |

All grades of Teas 25 to 40 per cent. lower than the cheapest retail dealers.

ALL GOODS ARE Guaranteed TO BE First Class

ONE TRIAL will Satisfy You.

Send for price list at once to

H. R. EAGLE & CO.,

68 Wabash Ave., Chicago.

# SAVE MONEY!

# H. Heyn's

## Department Store,

## 103-109 Wisconsin St., Milwaukee

——THE MOST COMPLETE STOCK OF——

# D·R·Y G·O·O·D·S,

Dress and Cloak Trimmings, Laces, White Goods, Embroideries, Notions, Hosiery, Underwear, Gloves, Corsets, Jewelry, Fans, Leather Goods, Black and Colored Dress Goods, Black Silks, Hand-Knit Goods of our own Manufacture, Yarns.

## The Largest Millinery Department in the State!

*The Finest Art Embroidery Department in the Northwest,*

*A Beautiful New Department for Cloaks, Shawls and Suits,*

*An Immense New Department for Toys and Fancy Goods.*

Especial Attention Paid to Mail Orders.

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# A Chance to Make $25.00 in Five Minutes!

——A GRAND OFFER TO OUR READERS BY——

# Dr. Valerius & Co.,

——IMPORTERS AND BREEDERS OF——

## Clydesdale, English Shire and Percheron Norman Horses.

Please write in the blank below the names of any stallion men that you know of, and especially anybody that you think wants to buy, cut the blank so filled up out of the Bulletin and mail it to us, after writing your name and address at the bottom in the space provided for that purpose. We will then write to the parties whose names you send, and try to sell them a horse. If we sell one horse to any one of them we will pay you twenty-five dollars for your trouble as soon as the sale is made. And for additional horses sold to the same party, or others on the blank you send, we will pay you twenty-five dollars more for each horse sold.

Your name will not be mentioned unless you request it. If you are not satisfied that we will do as we say, you can write to the Wisconsin National Bank, of Watertown, Wis., for information. If it should so happen that the same name be received from more than one person, and a sale is made, then the prize will go to the one whose blank is received first. It is therefore best to fill up your blank and mail it promptly.

Our correspondents sometimes wonder how we can make this liberal offer and yet sell better horses and cheaper than our competitors. Our answer is that we simply spend the money this way instead of paying tens of thousands of dollars every year for newspaper advertising.

Address:

**DR. VALERIUS & CO., Watertown, Wis.**

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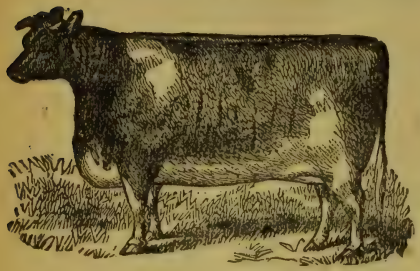
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# ALEX. A. ARNOLD,

## Eastville Farm, Galesville Wis.,





BREEDER OF

# SHORT-HORN CATTLE

—AND—

# BERKSHIRE HOGS.

## RECORDED CATTLE

—AND—

## REGISTERED HOGS

OF ALL AGES AND SEX, CONSTANTLY ON HAND.

## Stock Kept Constantly Thriving,

**BUT NEVER PAMPERED.**

## MILKING QUALITIES MADE A SPECIALTY

IN BREEDING SHORT-HORNS.

The Short-horn is standard for beauty and utility and the most valuable breed for the average farmer.

The Berkshire is also the standard hog, and weighs when mature, about 500 pounds, it furnishing, when ready for market, the best pork of all breeds, for the reason that the skin is thin, the bones firm and comparatively small, with more muscle or lean meat than any other breed. They mature early, are good mothers, prolific breeders, and when crossed on the large breeds produce best results.

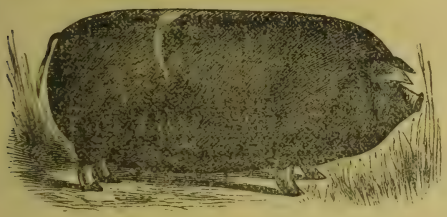
## COME AND SEE THE STOCK.

Correspondence Solicited.

A. A. ARNOLD,
GALESVILLE, WIS.

# GEORGE WYLIE,

*BREEDER OF RECORDED*



# POLAND CHINA SWINE.

—SPECIALLY BRED FOR—

MUSCLE, BONE, CONSTITUTION AND EXEMPTION FROM DISEASE.

—ALSO—

# SHORT HORN CATTLE.

**STOCK AS GOOD AS THE BEST, AND PRICES ALWAYS REASONABLE.**

COME AND SEE THE STOCK.

GEO. WYLIE,

Columbia County. LEEDS, WIS.

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# MILWAUKEE, LAKE SHORE & WESTERN.

# Through Palace Sleeping

—AND—

# Parlor Car Line,

—BETWEEN—

## CHICAGO AND MILWAUKEE,

—AND—

## APPLETON, WAUSAU AND ASHLAND.

The Gogebic, Penokee and Montreal Iron and Mineral Ranges, Hurley, Ironwood, Bessemer and Wakefield, Superior and Duluth, and the manufacturing centers and lumbering districts of Central and Northern Wisconsin.

## Sheboygan, Manitowoc, Kaukauna, Appleton and Wausau.

Special Inducements and Facilities offered for the location of Manufacturing Establishments. Close connections at New London Jc. with the G. B., W. & St. P. R'y for Winona, La Crosse, St. Paul and Minneapolis and the Northwest. At Ashland and Duluth for Northern Pacific and Pacific Coast Points.

## TO SPORTSMEN.

The most celebrated Fishing Resorts for Bass and Muskallonge in the Northwest are all reached by this Line—

GOGEBIC LAKE, THE EAGLE WATERS, PELICAN LAKE, THE ONTONAGON, BRULE AND OTHER TROUT STREAMS.

Guide Books, Maps, Time Cards, and full information furnished on application to the Gen'l Passenger and Ticket Agent.

CHAS. L. RYDER, Gen'l Agt. A. W. RUSSELL, City P. & T. Agt.
197 Clark Street, Chicago.

Milwaukee City Office, 95 Wisconsin St.

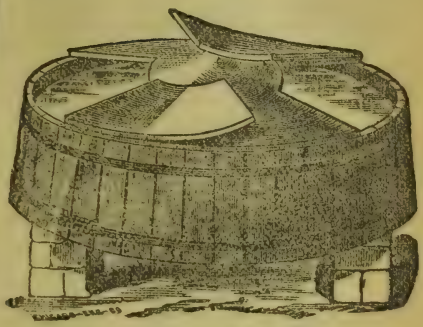
H. F. WITCOMB, Gen'l Manager, ERNEST VLIET, Act'g Gen'l Pass. Agt.

**MILWAUKEE, WIS.**

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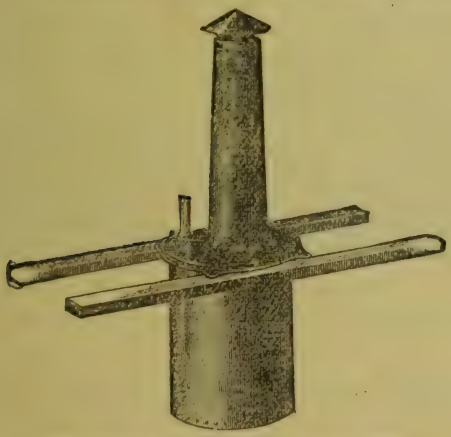



**No Dairy or General Farm is complete without the**



ECLIPSE WIND MILL, STOCK TANK,

AND



DECATUR TANK HEATER.

FOR PARTICULARS, ADDRESS

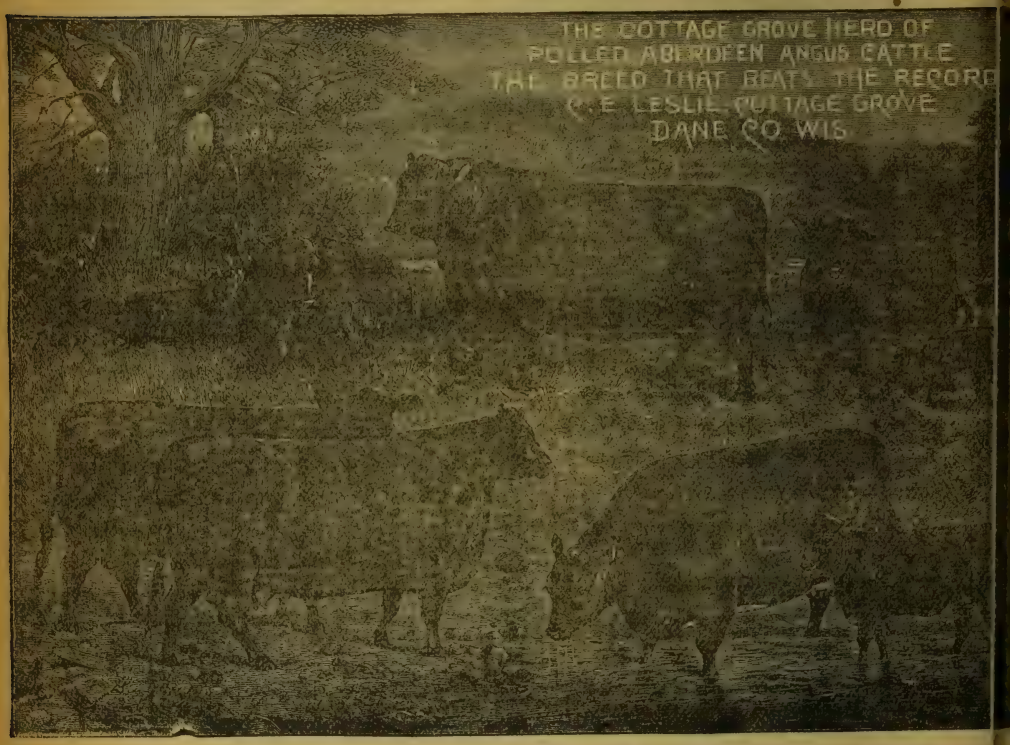
**FAIRBANKS, MORSE & CO.,**

Corner of Lake and LaSalle Sts., Chicago.

—DEALERS IN—

Fairbank's Scales and Agricultural Specialties.

# POLLED ABERDEEN
# ANGUS CATTLE.




We have the Largest Herd of Pure-Bred Angus Cattle in this Country. We will not be Undersold by anyone. Come and see our Stock, or write for Catalogue.

## SATISFACTION GUARANTEED.

We also have a large herd of $\frac{3}{4}$ and $\frac{7}{8}$ grades. All Black. No Horns. Beautiful in Form.

## WILL SELL VERY CHEAP.

——WRITE TO——

## LESLIE & BURWELL,

Cottage Grove, Dane Co., Wis.

☞ *Mention "Farmers' Institute Bulletin" when writing to Advertisers.*

# The Profit is in the Dairy.

Let us suppose that the general purpose cow when it is time to sell her to the butcher weighs 200 lbs. more than the Jersey, and suppose the Jersey during her life has yielded 500 lbs. more butter than the other, which is a conservative estimate, 200 lbs. old cow beef at 2 cts, $4; 500 lbs. butter at 20 cts., $100. Quite a margin in the Jersey's favor, eh? You have been supporting this extra in carcass all these years.

Texas men say now that they can put beef on Chicago market with a profit, at 2 1-2 cts. per pound. This must govern prices. You see our "general purpose cow" man works against great odds, while the Jersey man who relies on his cream that comes every day is reaping a steady harvest.

Ask a farmer the price for which he will keep a steer for you a year, and he will probably figure very carefully, and tell you that, take it the year around he will have to charge you about a dollar a week, or say, $50 per year, and he will claim that he cannot make anything at that.

The beef business is discouraging.

---

"The Maples" farm, the home of "The Maples Herd of Jersey Cattle," is situated at the eastern city limits of Madison, Wisconsin. It is easily accessible from the city, as any street car going east will take you within a few moments' walk. We would be glad to have you come out, whether you wish to purchase or not; you will feel repaid if you enjoy looking at fine Jersey cattle. The choicest strains of Jersey blood are represented in this herd, and the cattle have individual merit.

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# WISCONSIN

# FARMERS' INSTITUTES;

## A HAND BOOK OF AGRICULTURE.

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NO. 4—1890.

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EDITED BY

W. H. MORRISON, Superintendent.



MADISON, WISCONSIN:
DEMOCRAT PRINTING CO., PRINTERS AND STEREOTYPERS.

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# LETTER OF TRANSMITTAL.

HON. GEO. RAYMER,

*President of Board of Regents, University of Wisconsin:*

SIR:— I have the honor herewith of presenting to you Bulletin No. 4, Wisconsin Farmers' Institutes. The Agricultural Institutes conducted under the auspices of our State University speak for themselves in this volume. They speak for the growing interest which the farmers themselves are taking in those things, which will elevate the standard of Wisconsin Agriculture to its true place among the enterprises of our people, and give to the labor of the farm the standard of rank to which it is entitled in the world's battle of labor and enterprise.

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W. H. MORRISON, *Sup't.*

*Madison, Wis., July 9, 1890.*

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**For further information send for a catalogue, or address the President or the head of the department concerning which information is desired.**

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The facilities now provided to make the Short Course an intensely practical and profitable one for young farmers are very excellent.

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# LAW PROVIDING FOR AGRICULTURAL INSTITUTES.

*(Original Enactment, Chapter 9, Laws of 1885.)*

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CHAPTER 62, LAWS OF 1887.

AN ACT RELATING TO AGRICULTURAL INSTITUTES, AND AMENDATORY OF CHAPTER 9, LAWS OF 1885.

*The people of the State of Wisconsin, represented in senate and assembly, do enact as follows:*

SECTION 1. The board of regents of the state university is hereby authorized to hold institutes for the instruction of citizens of this state in the various branches of agriculture. Such institutes shall be held at such times and at such places as said board may direct. The said board shall make such rules and regulations as it may deem proper for organizing and conducting such institutes, and may employ an agent or agents to perform such work in connection therewith as they deem best. The course of instruction at such institutes shall be so arranged as to present to those in attendance the results of the most recent investigations in theoretical and practical agriculture.

SECTION 2. For the purposes mentioned in the preceding section, the said board may use such sum as it may deem proper, not exceeding the sum of twelve thousand dollars in any one year, from the general fund, and such amount is hereby annually appropriated for that purpose.

SECTION 3. This act shall take effect and be in force from and after its publication.

Approved March 16, 1887.

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MADISON, Wis., July 1, 1890.

HON. C. E. ESTABROOK, Madison, Wis.:

DEAR SIR:— It is my purpose to include in the forthcoming Bulletin some account of the life of the late Hon. Hiram Smith, and of his services to the farmers of the state of Wisconsin, and in connection with this subject it seems

appropriate to have from you, as the author of the law providing for Farmers' Institutes, some account of its origin. Yours truly,

W. H. MORRISON, *Sup't.*

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MADISON, WIS., July 9, 2890.

HON. W. H. MORRISON, Madison, Wis.:

DEAR SIR:—I am in receipt of your note of the 1st inst., relating to the origin of the Farmers' Institutes in this state. I presume you want to know how I came to think of the matter. I cannot tell exactly when the plan which was finally adopted became fully formulated in my own mind. It will perhaps best serve your purpose for me to state briefly the circumstances and conditions which suggested and preceded the drafting of the enactment in question.

In the early part of October, 1884, I listened to a short address by the late Hon. Hiram Smith to the farmers of Manitowoc County, on the grounds of the Industrial Association near the city of Manitowoc. The address was very practical, and one which any person of common intelligence could readily understand; and at the same time it was replete with information of the most valuable kind to the persons to whom it was addressed. It was in fact the summing up of years of valuable experience and study, and was being given under the most adverse circumstances, amid the noise and confusion of the fair ground. The first thought that occurred to me was, what a pity that the valuable experience of a successful life should be given out in such an unsatisfactory manner, and that no effort should be made to preserve the knowledge thus gained. That in a few short years, at most, the speaker would be no more, and that the result of forty years of earnest labor and success would then be lost. It then occurred to me that I would endeavor to get up a meeting of farmers of our county at some future time and invite Mr. Smith to address them under more favorable conditions. I had not considered this proposition long until it occurred to me that if such a meeting would be advantageous to the farmers of Manitowoc County it would be advantageous to the farmers of other counties in the state as well, and that if such a work should be undertaken it should be extended throughout the state. To do this required some organization; thus one idea led to another until the whole as it became a law was distinctly outlined in my mind.

This is as near as I can give the genesis of the law relating to Farmers' Institutes in this state; and while Mr. Smith had nothing to do in devising the scheme, it was his address that set the train of thought in action which gave birth to the plan which we finally adopted. As a matter of course, I had given the subject of education and agricultural education some thought prior to that time, and was familiar with the efforts in various localities to organize farmers' conventions and farmers' clubs, and I was also familiar with the work being done by the Dairymen's Association, Horticultural Society and other kindred

organizations. These societies and organizations and the labor of many individuals, including Mr. Smith, undoubtedly served to prepare the way for the Institutes. As soon as Mr. Smith's attention was called to the subject of the proposed Institutes, he at once recognized the value and promise of good to come therefrom. He said: "It is just what we want," and to his energy, skill and judgment a great deal of the success which has been attained in the direction indicated is owing. To us who survive him, while keeping his memory reverently, it will be no small satisfaction that we were instrumental in devising ways and means by which the fruit of his experience was preserved to the people of our state.

Yours truly,

CHARLES E. ESTABROOK.

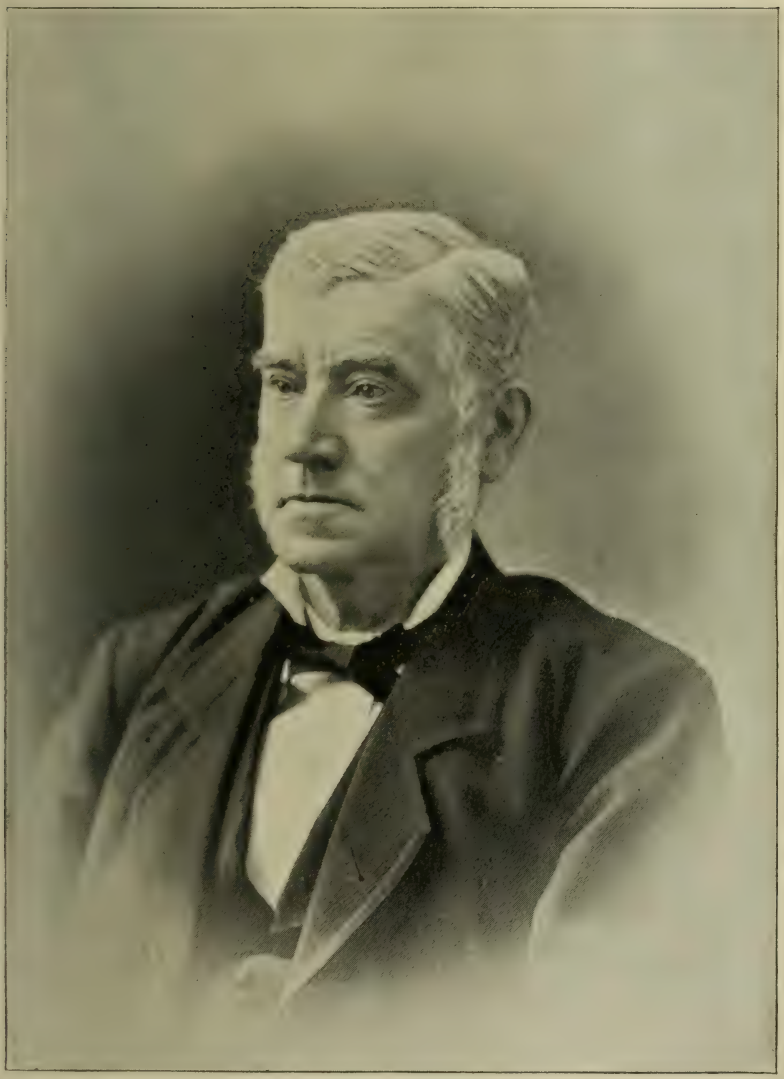
# In Memoriam.

Hiram Smith was a strong man. He was strong in his judgment, strong in his will, strong in his friendship, strong in his hatred of sham and hypocrisy and singularly sincere and strong in his love for right reason. He placed many well formed and solid blocks in the foundation of Wisconsin's agricultural prosperity. He made his own fortune with his own hands and with a mind untrained in the wisdom of the schools. He was self made but he did not worship his maker as is frequently charged against men of this class. His keen thought cut as clearly through the follies of conceit as through the slush of bad logic. He loved men and hated walking mummies as thoroughly as any man on earth. His broad public spirit was his grandest characteristic. The great ambition of his later life seemed to be to help his fellow farmers everywhere, to better fortunes and happier lives. In his own life he had felt the burden of poverty and the burden of thoughtlessness. With his strong will he had trodden them both under the feet of knowledge, and for years he was a teacher of men, that they might profit by the lesson he had taught himself.

No man knew better than he the hard side of the farmer's business as commonly followed, its grinding economies, its unceasing toil, its harrowing isolation, its often profitless labors, its unbusiness-like methods. The farmers listened to him because they felt he was one of them. No cultured graduate of a college could quite do what he did in stirring the dormant mental energies of his class. No man denounced more mercilessly than he, the faults which he found there, and yet no man could have a stronger faith in the possibilities of the average farmer's mind when stirred to action, than he had. For ten years before his death he had been one of the leading authorities in the dairy world. His farm had been a practical experiment station, doing gratuitous and valuable work for every person who kept a cow. His work and his style of stating the ideas upon which it was

based made him a correspondent eagerly sought by the leading agricultural journals of the United States. The State Dairymen's Association of Wisconsin is one of his monuments. Through it he has reached nearly every farm in the state, to a very large extent it is due to him that this organization has been kept steadily to its purpose, the education of farmers and the upbuilding of a great material interest. His generous character has helped to keep it free from the poison of envy and the stupidity of personal jealousy. His practical wisdom has made it a fountain of knowledge that has grown clearer and greater with each succeeding year. No person not a member of that association can understand the tenderness and strength of that feeling in its ranks which will be ever loyal to the memory of Hiram Smith. He was a friend of young men. Age never numbed the touch of his sympathies. His mind never grew old. He never caged himself in a prison of memories. As a regent of the University for twelve years he did a most effective work. Steadily he labored to build up the agricultural department and make it worthy of the institution and of the state. He has helped most ably to bring our Experiment Station to its present high rank. He lived long enough to see the first dairy school in the United States established under his direction. The Wisconsin Farmers' Institutes came as the outgrowth of his thought. To them he gave a gratuitous and a splendid service. Thoroughly at home on an institute platform, with the voice and earnestness of an orator and the clear cut thought of a practical man of affairs, he brought truth and conviction to thousands of men who needed both. Hiram Smith was born February 19, 1817, in Tinicum, Bucks county, Penn. He was married to Catharine A. Conover, March 20, 1845, and came to Sheboygan County July 4, 1847. He died at his home in Sheboygan Falls, May 15, 1890, at the age of seventy-three. The friends whom he had loved in life and who loved him said the words of parting and gently laid him to rest. He will be ever honored for he had "the love of wisdom and the wisdom of love."

H. C. ADAMS.



HON. HIRAM SMITH

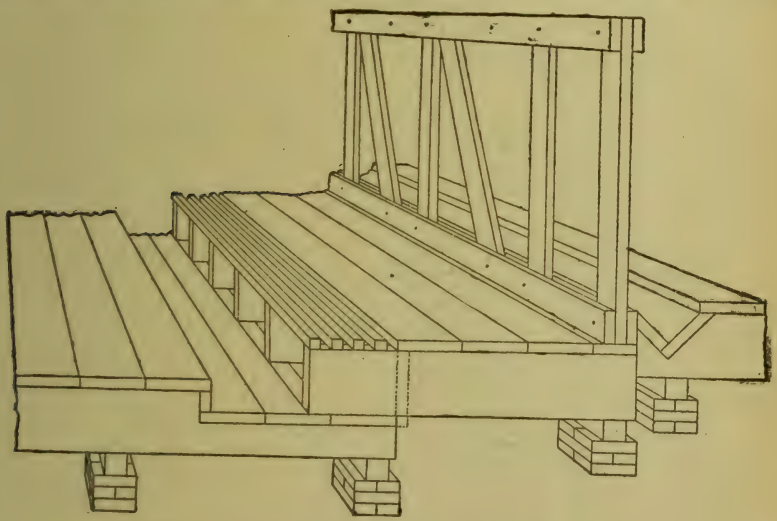
# Morning Session--Tuesday, March 25.

## ARRANGEMENT OF THE STABLE AND METHODS OF TYING.

By L. H. ADAMS, Supt. Experiment Farm.

### Cleanliness.

The prime requisite in dairying is cleanliness. Without cleanliness in the stable it is useless to go further, for no matter how perfect our knowledge is regarding the making of milk and the handling of it, the setting of cream and churning, if we fail in a dairy stable we are gone. Therefore it is well to commence at the bottom and see that we get started right.



*Cut Showing Floor and Watering Trough in Dairy Stable.*

### Stanchions.

We have had experience with several methods of tying at the station, but none have given such uniform success as the stanchion. There are opponents to the stanchion system of fastening cattle, but all things considered, I know of nothing that we can replace the stanchions with at the present day. We may get something that will supersede the stanchion before long, but in talking of these farm topics we must see that we keep within the bounds of practicability. If we advise something that is impracticable or beyond the reach of the average farmer it will do him no good, and in this talk I shall endeavor to com-

bine all the points of practicability, as near as I can.

### Stable Floor.

The floor that you see here represented on the diagram is essentially the same as the one in use at the Experiment Station farm to-day, and has been for the last three years. In putting this floor into our stable we took out a tight plank floor with a four-inch drop behind the cows; it was unsatisfactory. Our cows would get dirty in spite of a liberal amount of bedding used under them. This matter of bedding is a point that we must spend some thought upon if we wish to cut down the expense of dairying. Now, do not understand me as being opposed to the use of bedding; it certainly is a wise thing to do, but on the majority of dairy farms, where all the waste products are used, where nothing goes to waste, this question of bedding is a serious matter; we do not all have it. Farmers who utilize their oat crop, feed straw and all just the same as they would the timothy crop, and those who use the corn crop use the stalk and all, so you can readily see there is not much material left with which to bed a large herd of dairy cattle.

Now, with this floor you see represented here there is no absolute necessity in using bedding for the sake of cleanliness. There has not been a forkful of straw litter of any kind put on that floor in three year's time; and there is not a tag of manure or manure lock on the flank of one of the cattle.

The objection to the stanchion is the rigidity with which the cow is held in one position, the cattle being unable to turn around to lick themselves; but as every dairyman has it in his power to let his cattle out daily for exercise, this objection is not so bad as one would at first think. I would not advise stanchioning heavy beef animals, but should prefer not to fasten them at all but to feed them loose. But remember I am talking now of a stable and methods of tying for dairy cattle.

This floor here is six feet wide, and we can drive right in with a team and wagon and load the manure from the gutters on either side directly into the wagon. This floor that the animal stands upon is about 54 inches wide; our cows are grade Jerseys principally. This watering trough is made of two planks, one 10 inches wide and the other 12, spiked together and the bottom of this trough is on a level with the floor on which the cattle stand. The trough has an incline of one inch to every twenty feet which is sufficient to carry the water entering this end to the other; there is an outlet at the further end through which the water runs after the cattle have finished drinking. Feed is given to the animals in this same trough. The drop is 12 inches, from the slats down to the bottom. Whatever urine is on this floor goes right through and is taken up with an absorbent that is thrown between the joists that support this floor. The solid part of the excrement is all left along in this drop. A cow in urinating will drop the water further forward than she will the solid part of the manure, so that in cleaning out it is not difficult if the manure is out here.

### Absorbents.

For an absorbent we use horse manure. The horses stand over the cows and the manure is pushed through a hole daily down into the basement stable where the cows stand, and distributed along these gutters, and it takes up the liquid nicely and keeps the manure of the farm all together where it goes out. If, as I have explained, the

urine passes through these slats, you can readily see how the cow lies down on a dry floor. I think you will all agree with me that lying down in a damp place is more objectionable than lying in solid excrement. I would rather see a cow lie in a pool of water, for in milking, no matter how careful you are about brushing, there will be a flavor that you cannot keep out of the milk.

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DISCUSSION.

C. P. GOODRICH—Wouldn't you prefer to have your cows well bedded?

MR. ADAMS—Yes, I would prefer to have the cows bedded, provided I have the bedding, but, as I say, we utilize the waste product so closely that we do not have it.

C. P. GOODRICH—Don't you think it adds to the comfort of the cow?

MR. ADAMS—It does to a certain extent, undoubtedly.

C. P. GOODRICH—Wouldn't the platform be enough, so that you could dispense with the use of slats, if you have plenty of bedding?

MR. ADAMS—Straw will never take the place of slats at all.

C. P. GOODRICH—If straw was used on the slats the solid part of the manure would not be trodden through, and would dirty the cows up just as bad as though there were no slats there?

MR. ADAMS—Not so badly, for the reason that the urine would go down through. But there is no necessity of the cow lying in either the solid part of the excrement or the urine. The cow's feet should stand about over that second slat; that gives room enough for getting up and shifting position, without any extra exertion, and these slats aid the cows in getting up.

H. C. THOM—How far is it from the top of the slats to the bottom of the trench?

MR. ADAMS—It is twelve inches from the top of the slats down here; the cow steps up eight inches.

H. C. THOM—She never steps down into the trench?

MR. ADAMS—She never does; that is one objectionable feature that this floor overcomes; this floor being two inches longer than the plank floor does away with the cow stepping back and standing down here with her hind feet.

H. C. THOM—Do you ever have cows calve in the stanchions?

MR. ADAMS—No, sir; we always make a record of the date of service so that we always are warned and take the cow out of the stanchions; we have a hospital or box stall in the same basement barn that our cows are transferred to for at least a week previous to calving.

JOHN MARCH—Does the cow always comply with the record of the time she should calve?

MR. ADAMS—We have found that our animals do not vary more than from five to six days, and rarely ever as much as that.

CHAS. BRIGHAM—Of my cows one has calved three days less than nine months, and some have calved a few days over nine months and a half; now in such a case you would have to keep the cow in the box stall something over two weeks.

MR. ADAMS—Of course, in a normal condition a cow will not vary; but there are circumstances in which a cow will calve before or after, most always before.

GOV. HOARD—Do you allow your cows to calve in the stanchions?

MR. ADAMS—No, sir.

GEO. MCKERROW—Mr. Adams, what do you consider the best location for a dairy stable?

MR. ADAMS—The stable should be located on ground sufficiently elevated to carry off the outside water and to be well drained. We don't want any more mud around our stable than is absolutely unavoidable, and the stable should be built with its long way east and west and on the south side we should have just as many windows as we can get in, to afford light.

GEO. WYLIE—Does this method save all of the liquids of the manure?

MR. ADAMS—It does, with the use of an absorbent as I have described.

GOV. HOARD—What do you use as an absorbent?

MR. ADAMS—The manure from the horse stable.

GOV. HOARD—Do you use any land plaster in your stable?

MR. ADAMS—We have used no land plaster; we have used lime.

GOV. HOARD—Why do you use lime?

MR. ADAMS—We use it to take away the odor; it gives a sweet, pleasant smell to the stable.

GOV. HOARD—But lime is a disengagent of ammonia and land plaster is an absorbent of it.

MR. ADAMS—We get all the liquid taken up in the horse manure.

GOV. HOARD—That is very true, but at the same time ammonia is a volatile gas and if you use lime you will disengage the ammonia by the action of the lime.

MR. ADAMS—I don't want to be understood as deprecating the use of land plaster, there is no question but that it is a valuable thing to use. We use the lime because we have it on the farm more or less all the time in building operations. We had a lot left over that was slacked and we used it. If we were to buy an absorbent there is nothing that would be so effectual as land plaster.

SUPT. MORRISON—Don't you think it was a loss to use that lime?

MR. ADAMS—I don't think we saved anything by the use of the lime. I think that the addition of lime itself to the soil is an advantage, however.

GOV. HOARD—That is true; but if you take manure and add lime to it, you will fire-fang the manure.

QUESTION—Would slacked lime fire-fang the manure?

GOV. HOARD—Yes; it is the chemical action of the lime upon the constituent part of the manure, where all the ammoniacal parts are thrown out. You know when you are slacking lime how ammonia is disengaged and passes into the air, and the action of lime by dissolving in water upon the manure is destructive of the ammoniacal constituent of the manure. It disengages it. Land plaster is an absorbent of it; it becomes sulphate of ammonia, passes from sulphate of lime to sulphate of ammonia by the absorbing of ammonia.

SUPT. MORRISON—Give us your experience in reference to the matter of land plaster?

GOV. HOARD—I was led to the use of land plaster in stables from a study of its chemical affinities; finding that sulphate of lime had a powerful affinity for ammonia, then I thought to myself if it has so powerful an affinity for ammonia it ought to be valuable in the stable, where ammonia is being thrown off. I also noticed in handling horse manure, especially the bedding of a male horse, where the urine is thrown into the bedding under the horse, that when you take up the bedding in the morning it will often make your eyes smart and your nose sting, there is such a rise of ammonia in the air. Now that ammonia is worth seventeen cents a pound at wholesale, and New Jersey pays

three million dollars a year for the purchase of manure for ammonia. Now, I said to myself, ammonia is worth saving; it is worth saving by using sulphate of lime in the stable. I had a crowded stable of thoroughbred cattle, and a horse, and part of the time two horses, and I wanted to make that stable as healthy as possible for those animals, and I knew the action of the land plaster in absorbing those gases; it is a powerful absorbent. If you wish to try it step into a horse stable, and take a handful of land plaster and sprinkle it on some horse manure, and see how soon—in a second—it is gone. Go to a privy and no matter how rank it may be, and sprinkle land plaster on it, and see how quickly it is absorbed. Therefore it was of use to me in preserving the health of my animals and in the retention of this valuable component, worth 17 cents a pound at wholesale. I purchased a barrel of land plaster at $1.60, and it lasted with nine animals through the winter. I am confident it added to the manurial value of those animals that winter at least ten or twelve dollars. It is most valuable, and I cannot too strongly urge that it is a most valuable and paying thing to do—the purchase of land plaster and the sprinkling of it night and morning in the stable.

Fermentation in the manure heap, if too great, will produce fire-fang, which disengages elements that would be of value; land plaster retains them upon the land.

T. J. FLEMING—It seems to me that a cow going up on to that bed with no litter on it and constantly wet is liable to slip. I raise that question because the drop I have got is only seven inches and gives very good satisfaction.

MR. ADAMS—I would answer Mr. Fleming's question by saying that the drop we took out of our floor previous to putting this one in was four inches. We were obliged to take it out owing to the fact that the solid part of the manure in 24 hours would pile up to such a height that they had got to lie down in it. We increased the drop in another stable where steers were being fed to eight inches and the same objection was encountered there to a considerable extent. When we made up our minds to replace the old floor in the present dairy stable we put in this 12-inch drop and the cows never come in contact with the manure and we find no objection to the 12-inch drop, because the cows can get on to the floor readily; once up on that floor there is no occasion to step down until they go out of the stable and when we let them out we loosen the cows at one end of the stanchions and the cow turns around and walks on this floor and walks off here; she doesn't back off; she steps off.

T. J. FLEMING — Were those steers fastened with stanchions, where the drop was eight inches?

MR. ADAMS—They were fastened with chains around their necks that played up and down on a perpendicular pole.

T. J. FLEMING—I think that makes a difference as to the height of the drop, whether they are fastened with chains or stanchions. I don't think you will experience any trouble with milch cows with an eight-inch drop.

THOS. CONVEY—Is a slanting floor in a stable objectionable?

MR. ADAMS—I can't answer that question from experience. But when I could have a level floor that would answer the purpose of a slanting floor I would prefer that the cow stand on the level floor.

WELDON VAN KIRK—By the use of

this lime are you able to take away the odors of the stable entirely?

MR. ADAMS—Not entirely. We have got to depend upon ventilators to a great extent to carry off the foul odors of the stable.

WELDON VAN KIRK—What is the best way to ventilate a stable?

MR. ADAMS — Undoubtedly the best way is by running chutes or shafts of any size from a foot to two feet, that may be utilized for throwing feed down at the same time; run these from the top of the barn, where there is a free outlet, down to the basement of the stable and down to within two feet of the floor.

JOHN MARCH—Would dry earth with a little charcoal mixed be a good substitute for lime as an absorbent? We all have plenty of soil and can store a little and have it dry and use it in that way. I find it good.

MR. ADAMS—It would undoubtedly. Last fall we scraped up dust when it was extremely dry with us; we went out into the road and gathered up ten or twelve barrels of road dust and stored it away and are using it now as an absorbent behind young calves.

H. ROBBINS—What do you consider the best system of tying to use in an ordinary cow stable?

MR. ADAMS—That is the kind of a stable I am trying to talk about—an ordinary cow stable, and I think the present stanchion is the best system to use.

GOV. HOARD—Why do you like the stanchion?

MR. ADAMS—Because it will hold the cow in the best manner and enable us to keep her clean with the least trouble and most satisfaction.

GOV. HOARD—Do you think it a comfortable thing for the cow?

MR. ADAMS—For the average dairy animal, that does not weigh over seven to eight hundred to nine hundred pounds, where she may be let out daily for exercise, I don't consider it a bad practice to keep them in stanchions.

H. ROBBINS—Do you consider it necessary to the health of animals to lick themselves?

MR. ADAMS—That is undoubtedly a very natural proceeding; how necessary it is I am unable to say.

GOV. HOARD—Do you think it would be a good thing for you to be cramped up with your head and your neck between two rigid bars, and when you lay down, obliged by nature to turn your neck one way, and then be obliged by these scanchions to lie with your neck straight up and down?

MR. ADAMS—I will answer that question like a Yankee usually does by asking another. How can we fulfill the requirements of cleanliness in any other way than by the use of the stanchion, without confining her so that she will be able to raise herself as she does naturally in the pasture, and to lie down naturally—how will you do this with the same outlay for room in the stable? If you use box stalls you can't get as many animals in a given space. I don't say there are no disadvantages to the stanchion system, I don't claim it is natural for a cow to stand in a stanchion. Is it natural for her to be in a stable at all? Was the cow ever intended for a stable? We have got to restrict her in some sense by any tie that we employ. The question is, what is the best tie? One man will say this and another that.

GOV. HOARD—I want to ask how much space is allowed in your diagram for each cow, from backbone to backbone?

MR. ADAMS—Four feet is ample.

GOV. HOARD—I have a system, if you

will come over to the Executive barn, and I will show you a stable where two cows are kept so clean that on the flanks of one which is a little white you will scarcely find a stain, and I allow three feet and a half of space.

MR. ADAMS—As I said four feet is ample, and there are numerous stables where the space for cows in stanchions is not more than three feet.

GOV. HOARD—It seems to me that as the cow is a mother she ought to be handled with a constant regard for her comfort, and that a rigid stanchion is the most comfortable thing in the world for the man that owns the cow, but not for the cow herself.

MR. ADAMS—Undoubtedly the most comfortable way of handling cattle would be for them to run loose; that is the system that I should advocate if it were a practicable one. I would allow the animal perfect liberty. But that would require too much space and would necessitate this practice of dehorning to a considerable extent. It seems to me, with our present knowledge, there is nothing at the present time on the average dairy farm, where there are from 25 to 50 animals kept, that will supersede the stanchion. I hope we will have something better in the future. I know a man in the state of Washington who is going into the dairy business. He objects to the stanchion, and what does he substitute for the stanchion? He has a chain running the entire length of his stable just in front of his feed manger, and he ties the cows to the chain. She can't turn her head to the right or left to turn around and lick herself any more than she can in the stanchion, and in getting up or lying down they are apt to get their heads over or under that chain; they are more liable to accident. He has confined his cows in just about as rigid a manner as if he had put them in the stanchion, and he hasn't the benefit of the advantages the stanchion offers.

GOV. HOARD—We haven't said anything yet about your watering trough.

MR. ADAMS—The watering trough is made of two plank, one twelve inches wide and the other ten inches wide. The trough inclines an inch to every twenty feet. The water runs in through a pipe from the tank, which is about a foot above the level of this trough in the barn, and runs the entire length of the trough and the animals stand in the stanchions and drink in a very satisfactory manner, the weak and strong alike. They all have to wait their turn. The first cow will commence drinking and the first two or three will take up the entire quantity of water poured into the trough, and when they get through it will run down further, and I water the entire row of cattle without running out as much as a pailful at the other end at the time they get through. The water is clean and nice, and it is warmed in the tank before it comes in so we have no trouble with freezing pipes.

H. C. THOM—A barn 40 feet wide and 60 feet long will accommodate 20 cows; if you give the cows a space 16 feet by three feet each side, there is plenty of room for the cows; they can lie down and can lick themselves at pleasure, and I believe the time is soon coming when the dairymen of the state will adopt that method.

C. P. GOODRICH—What kind of a time would you have when you wanted to milk?

H. C. THOM—I would have the head of this platform a stanchion and would put them in that and milk them, and would turn them loose after that.

# MANURE.

By H. C. THOM, Dairy and Food Commissioner.

### Economy.

I won't talk on the subject of manure from the standpoint of a man who has a hundred cows. I will talk about where a man has a dozen or fifteen cows. I will start with a proposition that will meet with objection. I deprecate the practice of throwing out manure every day. I don't believe when you take out manure every day where bedding is used liberally that you get the greatest advantage from that manure. I think that manure to give the soil the greatest benefit should be thoroughly rotted. There is nothing in straw when it goes on to the field in an unrotted state that will give the soil much strength, but if you take straw from the stack and so handle it that it becomes thoroughly rotted it is of great advantage to the soil. Now, my idea in speaking of cows running loose was that the stable should not be cleaned from the time the cows go in to the stable in the winter until they come out in the spring. That may be opposed to your ideas of cleanliness but your ideas are wrong about that. With a fair use of land plaster as an absorbent, you can keep the stable just as free from bad odors as this room is at present. I have done that now for a number of winters. I wouldn't use lime for the reason, as has been stated, it is a dissipator of ammonia, and ammonia is a fertilizer, and if you disengage the ammonia you are losing fertilization.

### No Waste.

Now, if these stables are liberally bedded, you will accumulate in six months, from two and one-half to three feet of manure, and it can be taken out after the crop is cut and distributed where it should be distributed, upon the grass land, and it is in the best possible condition and you have saved every ounce of liquid and you have saved every pound of solids. There is nothing that has escaped; you have got it all.

Now, I have two barns, one 40×60 and the other 24×48, in which cattle run all the season through, and when that manure is taken out and put upon grass land upon half of a field, you can tell that grass land just as far as you can see it the next year. The idea of putting manure in heaps belongs to the dark ages. The idea of putting it in a yard and letting it spread all over a yard is not economical. But if manure is taken into a yard and there is something of a hollow in the yard, or better still a hole made on purpose, and the manure is put into that and so handled that it does not fire-fang, I believe that but very little of its value has been lost.

### Fertility is Wealth.

Every one knows that the Germans are especially noted for their economy in the handling of manure. One of our most successful farmers, Mr. Linse, of La Crosse, has a hole or pit dug in his yard, and it is stoned up and grouted on the

bottom, and in the bottom is a round hole with a grating over it. The top of it comes up four feet above the surface and he drives right to it, and all the manure from his barn is put in there, and there is a cover over it, and when he comes to draw it out, he drives his team right in there and loads from the side. He puts a pump down into the hole below the grating and pumps up the liquid, and he has a long, tin spout which he can swing around, and he covers the top of the pile with the liquid that comes from the bottom; and Mr. Linse's success in fertilizing his farm has become a matter of comment all over the State of Wisconsin.

There are many farmers in this state who have straw stacks; some are burned; they are considered of no commercial value. If they are correctly handled and turned over two or three times in such a manner as to wet down, you will find you will get a body of pretty fair manure out of it.

Mr. J. M. Smith, of Green Bay, who has produced the richest forty acres of land in Wisconsin, never thinks of distributing manure directly upon land, but places it in compost heaps and it is turned over and handled and at last carried out on to the ground, and I believe that in this respect we can economize in the management of the farm.

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DISCUSSION.

L. C. ADAMS—Does fermentation in manure increase the value of it?

MR. THOM—It does not.

GEO. MCKERROW—Which are the more valuable, the liquids or the solids in the manure?

MR. THOM—It is conceded by nearly every one that the liquids are.

GEO. WYLIE—What per cent. is lost by piling manure in heaps?

MR. THOM—I think it is a very small percentage that is lost.

GEO. WYLIE—In heaps in the fields I mean?

MR. THOM—It would be a dead loss to me; I have tried it several times.

THOS. CONVEY—Does the storing of manure in large heaps cause fermentation?

MR. THOM—Yes.

THOS. CONVEY—And you say fermentation does not increase the value?

MR. THOM—Yes, sir.

THOS. Convey—You store manure in sheds, do you?

MR. THOM—Yes, sir, I do.

THOS. CONVEY—Do those statements agree?

MR. THOM—They do in practice; they may not in close theory.

THOS. CONVEY—Do you favor the use of land plaster?

MR. THOM—I do.

THOS. CONVEY—Does it have an equal effect on all kinds of soil?

MR. THOM—I think not; I am talking about it in reference to the manure and not the soil.

JOHN MARCH—Do you have a stairway for your cows to get in and out of your stable?

MR. THOM—It doesn't take very much of a stairway for the cows to get up or down three feet. An old German up to Kewaunee says, It's all bosh. I said, Have you tried it? No, he said, if you let your cows run in there all winter by spring they will be way up by the ridgepole. But it is not true. My cows have never accumulated over three feet in a winter.

J. M. TRUE—Do you understand there is always an escape of ammonia when there is fermentation in a manure pile?

MR. THOM—No, sir, I do not.

GEO. MCKERROW—If you have grass

land to put this manure on wherein is the loss in hauling it out every day?

MR. THOM — Well, my experience has been in putting it on meadows, that I have got a combination in the next cutting that is not very desirable; there is a large amount of straw in it.

GEO. MCKERROW — What objection is there to it on pastures?

MR. THOM — Coarse manure cannot be distributed without loss to the pasture, it destroys some of the grass.

GOV. HOARD — Can you manure a pasture without having it offensive to the cattle?

MR. THOM — No, sir; but two or three rains will remove that.

C. P. GOODRICH — Now, I want to know when and under what conditions you would apply manure to the land?

MR. THOM — After it was rotted I would put it on the meadow after hay cutting; I would never think of putting manure on ground and plowing it under.

C. I. BRIGHAM — Do you have to bed your cattle every day?

MR. THOM — Not always; if the cattle are bedded every other day it is sufficient. A creature running in that manner never lies down on the same droppings twice.

C. I. BRIGHAM — Do you feed in mangers?

MR. THOM — I do.

C. I. BRIGHAM — How do you arrange your mangers so your cattle can eat out of them towards spring?

MR. THOM—There is no floor in the barn; this is the feeding floor, and the bottom of the manger is right here, about three feet high; then I run two by fours and fasten them up at the top, and then across here I put another two by four this way so, that leaves a square hole for every animal to put its head in and eat from the manger which is on a level with the feeding floor, and in the spring, if there is three feet of manure in the stable, the cattle can still easily eat from the manger.

MR. DOWLING—I have been compelled to use an absorbent behind my cows which has been rather costly to me—it was burned clover.

R. W. DENNIS—What is the value per cow of the liquid droppings for a year?

MR. THOM—If you will consider the whole manure worth $10, I should say that the liquid manure would equal about six of it.

C. I. BRIGHAM—What is the value of manure from one cow through the year, as you operate them?

MR. THOM—A ton of manure on land worth $100 an acre should be worth $2; if it is on land worth $10 an acre it is not worth so much.

ORANGE JUDD—I have seen this practice of not removing the manure from the building until spring in western New York with large herds of sheep, where the manure has been left until it raised to four or five feet in height, in a large ground cellar. But I do not think it is a good practice generally where we have not plenty of bedding.

I want to say a word in regard to the use of absorbents and ammonia. I was very strongly of Gov. Hoard's opinion and theory after I had spent three years in a laboratory, but I have changed my opinion a good deal since, and I think the experience of those who have tested it has changed. We may get a little smell of ammonia from the manure, but there is not much ammonia there. The escape of ammonia does not amount to so much after all. No appreciable amount of ammonia will escape so long as moisture is present; if the manure is kept

damp not enough ammonia to amount to anything will be lost.

GOV. HOARD—Where does it go when it fire-fangs?

ORANGE JUDD—Fire-fanging is lack of moisture. Land plaster is very good in certain places, but until we know by experiment where it is good, it is not really well to buy it.

GOV. HOARD—Do you mean to use on land?

ORANGE JUDD—Yes. It is not worth its expense as an absorbent; I am quite sure of that. Soil is much better. I have carried on some experiments in that line. We want plaster on some of our soils, but it is far too expensive to use as an ordinary absorbent.

J. M. TRUE—Don't you believe that land plaster has a tendency to fix the ammonia in the manure?

ORANGE JUDD—Not so much as supposed. There isn't a great deal of interchange of elements in changing the sulphate of lime into the sulphate of ammonia. Under proper conditions of heat, etc., there may be—in a laboratory for instance. I rather object to the governor's theory, except where you want the land plaster on the land. As a general observation, the plaster is far too expensive where it is not wanted outside of the manure. Simply dry earth, rotted manure or burnt clover, or any material that you can throw in will do very well.

GOV. HOARD—We have got to be very careful in our experience meetings. We must not pound one another over the head because our experiences differ. I have been making some experiments in regard to the fertilizing values of manure from the use of land plaster. I will give you one. I took seventy rods of ground, and used a barrel of land plaster, and with those cattle it amounted to sixteen loads of manure; the ground was so poor that it would hardly produce a crop of potatoes. The land was planted to corn and the manure was put in there green. The land was planted and the manure was put on and dragged under. There was a barrel of land plaster in this manure. The corn was planted the 9th day of May that very dry severe season we had. The corn seemed to find sufficient land fat in that green manure so that it never stopped growing a moment, and I had stalks in sixty days' time that weighed ten tons, cut even with the ground. I cut on that piece of ground, four tons 170 pounds of cured corn fodder, cut on the 15th day of August and weighed the 15th of November. On a corresponding piece of ground with manure that had no land plaster in it I had a most signal failure. Now, if with the same season, and the same quality of manure and the same quality of solid and the same kind of crop, I produced those diverse results, it was to me a very significant experience.

SUPT. MORRISON — The question of "watering" will now be taken up by Mr. T. J. Fleming, of Watertown.

MR. FLEMING — We will consider the subject open for discussion at once. Are there any questions?

H. C. THOM — Would you heat water above 70 for cattle?

MR. FLEMING — In winter I would heat it higher if I had the facilities for heating.

C. P. GOODRICH — If you could give cows water fresh from the well at, say 48 degrees, would you think it would pay to heat water?

MR. FLEMING — I don't *think* it would pay; I know it does from my own experience.

GEO. MCKERROW — If they could drink

this water at 48 degrees in the stable, don't you think it would be better than to have them drink it out doors?

MR. FLEMING — I don't think the advantage, if there is any, derived from watering stock in the stable will pay for the extra expense; heat the water outside and let your stock go and drink it.

C. I. BRIGHAM — How are you going to heat water for a herd of forty cattle?

MR. FLEMING — Go to the necessary expense of putting in heat.

C. I. BRIGHAM — How much would it take?

MR. FLEMING—It differs; I can't tell you how much a water tank costs; after making cheese I turn the steam in the boiler of my engine into the water tank, which gives me the necessary heat. But if I had to put in the necessaries for heating water I would be willing to do so.

C. I. BRIGHAM—What would be the profit in one season of heating water?

GOV. HOARD—It would cost you about $50 for good apparatus and about five cents per day for soft coal.

MR. FLEMING—I have had but a crude way of experimenting with this question. Up to three years ago I always watered my cows with the cold water as it came from the well. When I got to dairying as I thought I should I began to heat the water to a temperature of ninety degrees and found that the cows yielded very nearly twenty per cent. more when receiving this warm water than when receiving the cold water, all other things being equal. I attributed this to the warming of the water and to the facts that the cows drank more of it.

SUPT. MORRISON—Would you advise offering cows water more than once a day?

MR. FLEMING—Had I the facilities without incurring extra expense I should water my cows twice a day in winter, but I am obliged to water them only once.

MR. RUNDLE—What is a usual and cheap method of heating water?

H. C. THOM—I have an ordinary cast-iron heater, running into the side of a 25 barrel tank; it costs I think eleven or twelve dollars. I use in that heater such drift stuff as may be found about the farm, sometimes cobs, sometimes short pieces of roots and soft coal, soft coal is the safest on account of sparks.

L. C. ADAMS—Do you think it profitable, Mr. Fleming, to warm water for animals fed for beef purposes?

MR. FLEMING—I have never fed any beef cattle and I don't think I am prepared to answer that question intelligently.

SUPT. MORRISON—Does the purity of the water have any influence on the quality of the milk?

MR. FLEMING—I believe the purity of the water from the milk standard is one of the most important elements which enters into the production of milk. If we look at the office of water in the manufacture of milk we come to the conclusion readily, that water is one of the leading constituents. The water drank goes directly into the blood. It is from the blood the milk is manufactured or elaborated. We find that the blood which circulates in the mammary glands of a milch cow is almost like milk itself. In good milk we find that 87 per cent. of it is water. When water constitutes so large a per cent. of the milk, it is impossible to say that a cow may partake of impure water, and yet say that the milk can be pure?

H. C. THOM—Cows will drink impure water rather than fresh.

MR. FLEMING—That may be due to some disarrangement of the animal system.

GOV. HOARD—Isn't it due to the temperature?

MR. FLEMING—I don't think it is always the temperature. We have sometimes seen brood sows consume the after-birth. I believe there is some disarrangement of the system which induces them to do so and I believe it is equally so with cows. I don't think it is worthy of consideration why it should be so. We should say, it will not be so. We should not let our intelligence be over-balanced by the instinct of the animal. It is not good for us to drink impure water; and what is not good for us is not good for the cow, as I believe.

MR. HURD—Can the gentleman get any more cheese by using warm water than he can by using cold?

MR. FLEMING—I get an increase in the flow of milk, and I find that the milk is proportionately richer, and consequently I have a profit at the cheese vat as well as at the milk pail.

H. C. ADAMS—Does the quantity of food consumed by a cow bear any relation to the amount of water she drinks?

MR. FLEMING—It does bear a relation to the amount of water, especially as regards the amouut of moisture in that food; if a cow is kept upon dry forage she will drink considerably more water than upon a greener or more succulent food. A cow is not on full feed unless she gets all the water she wants to drink.

ORANGE JUDD—The governor stated an apparatus for warming the water would cost $50. That would scare the great bulk of farmers from adopting that process.

GOV. HOARD—That would be the outside cost of any process.

ORANGE JUDD—A large tea-kettle fitted with a rubber tube will take off the chill of the water, simply running the tube from the nozzle of the tea-kettle and fastening it to the boiler. I believe very earnestly in this heating of water.

SUPT. MORRISON—I was talking with one of the best dairymen we have Mr. John Gould, and he said that he put into his stable last fall a galvanized iron tank, holding 30 barrels, which cast him $19. He gives his cows water at 50 degrees; there is no warming whatever; it is run through underground pipes from the well, pumped directly from the well and it runs into this tank, they receive the water at the same temperature as the stable.

THOS. CONVEY—Should an animal's preference be taken as a guide to go by in watering cows, that is, as regards warm or cold water?

MR. FLEMING—I think not; you can educate them to drink warm water just as well as cold; I have found as much difficulty in getting my cows to drink cold water in the winter after they have been on warm water, as it was to get them to drink warm water after they had been on cold water.

GOV. HOARD—There is a phase of this question of warming water for milch cows that men do not see, physiologically. There is not a real sensible woman, a mother, in this community but what would say to a mother nursing a baby, drink warm drink; that is the old, substantial judgment of every mother in the world. Every mother will tell you if you drink ice-cold water you dry up your milk. Now this applies to a cow as well as to a woman; the lacteal function is the same. The intelligent human mother drinks warm drink; the unintelligent human father forces a cow to drink cold drink and wants that she should give just as much milk. You are making merchandise out of the mam-

mary function of the cow. It is for your advantage to promote the flow of milk; a chill operates upon the functions of the mammary glands and has a tendency to close them up, and stops the lacteal secretion.

PROF. D. E. GARDNER—Is there a danger of cows getting too much cold water on a summer day?

MR. FLEMING—I think if they are kept from water for a long length of time on a warm day and become heated up above their normal temperature, there is danger.

H. ROBBINS—Would you give a cow free access to cold water out of a tank after calving?

MR. FLEMING—I wouldn't give a cow free access to water until two or three days after calving.

R. W. DENNIS—Would you give them more water after calving than before?

MR. FLEMING—I would give them drink sparingly.

## CARE OF THE COW AT THE TIME AND AFTER CALVING.

SUPT. MORRISON—In the absence of Mr. H. C. Adams, to whom this subject was assigned, Mr. C. P. Goodrich, of Ft. Atkinson, will introduce the topic.

MR. GOODRICH—I suppose it is expected that I shall stand up here and you ask me some questions and see if you can't get a little out of my brain that will do you some good. If you can you are welcome to it; I haven't got but little out of it myself that has been any good to me.

C. I. BRIGHAM—How soon after calving do you consider it necessary to milk a cow dry?

MR. GOODRICH—I generally milk her partially dry as soon as I find her, but not entirely so.

C. I. BRIGHAM—Is is good to feed the milk to the cow?

MR. GOODRICH—I really can't say whether it is or not; I have tried it and the cow did well; I have withheld it and the cow did well.

WELDON VAN KIRK—I would like to ask Mr. Goodrich his idea of the cause of the retention of the after-birth?

MR. GOODRICH—I haven't had a case of that kind for I think five years. I take good care of my cows and feed them well and they are not troubled that way.

GEO. MCKERROW—Do you feed your cows heavily, for a month before calving, we will say?

MR. GOODRICH—I do not; I feed them but very little corn.

J. M. TRUE—What is the special character of the feed that you feed for the last month before calving?

MR. GOODRICH—I feed good hay and good corn fodder, and feed ensilage now; and the grain part of it would be oats and bran, but not corn meal.

H. C. THOM—Do you think that is an infallible recipe for getting rid of the after-birth?

MR. GOODRICH—That wasn't a recipe for that at all, but I think good keeping helps.

J. M. TRUE—Don't you think there is

a good deal in the character of the feed that is fed during the last few weeks in its effect upon the retention of the after-birth?

MR. GOODRICH—I don't know.

GOV. HOARD—Don't you think that a feverish condition of the cow tends to the retention of the after-birth?

MR. GOODRICH—As I said to start with, I haven't had much experience with that trouble, but I used to, years ago when I didn't take so good care of my cows as I do now; they were exposed to storms, and drank ice water, and, on the whole, were not very well taken care of, and I occasionally had such a case then.

GOV. HOARD—Do you know whether it is frequent or not for cows when on pasture to have a retention of the after-birth?

MR. GGODRICH—I don't think it is very common.

GOV. HOARD—Is it as common as when fed on winter feed?

MR. GOODRICH—The cases that I used to have were in the spring, in March and April, when they were fed on dry feed.

MR. SLOAN—When should you take the calf from the cow?

MR. GOODRICH—I think it is best to let the calf run with the cow and suck the cow for two or three days, until the milk is good, for the reason that I think the other course is more likely to produce milk fever.

MR. SLOAN—You don't milk the cow dry the first time then in order to prevent milk fever?

MR. GOODRICH—That is an idea that I have, that they are not as likely to have milk fever if the cow isn't milked perfectly dry; it may be wrong.

R. W. DENNIS—What is the simplest preventive of milk fever? And also you said you fed your cows on bran and oats; do they give a good, rich, heavy cream when you feed them on oats and bran?

MR. GOODRICH — What I said as to oats and bran was before calving, but I will say that they will give just as rich milk fed on bran and oats, as on corn meal.

R. W. DENNIS—I have been feeding about a half dozen cows this winter, on clover hay and bran and oats in equal proportion to the clover they were fed, and the complaint was that there was no cream on the milk all winter. I had a quantity of fox-tail in my oats a number of years ago and I screened it out and fed it with oats to my cows, and when I fed that we got heavy cream; but after that when the cows were fed bran with oats they gave but little cream.

MR. GOODRICH—I think I can see the cause why a great many fail in feeding bran. It is light stuff, and they have been feeding heavier feed; they will have oats and corn ground together and feed a panful; but a panful of bran isn't worth as much; if you will feed just as much in weight of it you will have better success.

R. W. DENNIS—When I was feeding the fox-tail I used a third of the fox-tail and two-thirds of oats.

GOV. HOARD—What do you mean by fox-tail?

R. W. DENNIS—It is a kind of stuff that grows all over this part of the country, in the oats particularly, and very often in the corn, if it is neglected.

SUPT. MORRISON—As a general thing the poorer the farmer the more fox-tail you will find?

R. W. DENNIS—Yes.

MR. GOODRICH—I can give you a sure preventive of milk fever; you can starve it out of them. You starve a cow a month and she will never have any milk fever, but if a cow is a good cow and

well taken care of I don't know of any sure preventive. I have had several cases of milk fever. The first two cases I had, the cows died; the next one the cow was ruined; since then I have not lost any. I use aconite, twenty drops of the strength made to use with animals. It is tincture of aconite such as they sell for stock.

MR. HENDERSHOT—Do you think it is injurious to a cow to eat her after-birth after calving?

MR. GOODRICH—Where she has an opportunity to do it I allow her to do it, if she wants to, and I don't know of any hurt it does.

T. J. FLEMING—Don't you think it will make the cow sick?

MR. GOODRICH—I have never known it to.

JNO. MARCH—What is the best treatment for a caked udder?

MR. GOODRICH—Well, I don't know of anything you can do for it only to feed the cow very lightly, and keep the milk out of it.

GEO. MCKERROW—Is there any ointment in use that is good for that?

MR. GOODRICH — I never have used any; I presume there is.

MR. SLOAN—I had a cow with a caked bag and I made a liniment of glycerine and —— in equal parts, and rubbed it on externally.

T. J. FLEMING—I have a simple and effective remedy for caked udder. I use 20 drops of tincture of aconite, putting it on an ear of corn, which is the best way to get the cow to eat it; then I take about a half bushel of bran and put it into an old horse blanket and steam it and then wrap it around the cow's udder, over the abdomen and across the loins; I don't know as that has any effect any more than retaining the heat, but that has a tendency to extract the inflamation; three doses of aconite, with this treatment, has invariably succeeded with me; I wouldn't give the doses nearer than an hour and a half apart.

SUPT. MORRISON—We have had discussions all over the state in reference to the retention of the after-birth, and a great many cures have been brought out. The most reasonable one I have heard was from an old dairyman the other day. He said sometimes this after-birth was retained and had to be taken away, and he had to send for a veterinary surgeon. He said if it ran above a day he gave a fluid ounce of ergot in a quart of warm water and that he followed with glauber salts, and then about an hour after he would give about one pailful of warm water, and a tablespoonful of ginger stirred in with about a quart of middlings or bran; since he commenced that system of feeding the cow he had never had a case where the after-birth was retained.

MR. PERRY—If you feed cows oats, the same as you do horses, for two or three weeks before they are expected to come in, the after-birth will not be retained. In some cases it is pretty difficult to discharge the after-birth when it is retained.

J. M. TRUE—The point made by the gentleman is a good one. The subject of prevention is a much more important one than how we may cure anything that is established in the shape of disease. I think the question of feeding in its relation to the retention of the after-birth is one that should be carefully considered.

H. C. THOM—I don't believe that any feed fed to the cow is an infallible recipe for getting rid of this after-birth. Every man who has got five or ten cows meets with this difficulty every year almost. I believe it is the worst policy to

allow an after-birth to follow the calf by more than twelve hours. I don't think the milk is fit to use for a long time, if retained longer than that. If you feed your cows in the most intelligent way yet you will have cases of the retention of after-birth. I have seen cows as fat as hogs and as well kept as could be and that still retained the after-birth; I have seen them in medium condition and still retain it. The best dairymen in the state have experience with it. It is a physical matter; the after-birth is retained by tissue. There are buttons fastened into these little pockets and they are fastened with this tissue, and I don't believe ergot will take it off. I believe a cow will contract the habit of retaining the after-birth. It runs in a family, like a wooden leg sometimes.

J. M. TRUE—Would you keep a cow that had the habit of retaining the after-birth?

H. C. THOM—No longer than I was obliged to.

THOS. CONVEY—Don't you think feeding on oats, a laxative feed, will tend to prevent the retention of after-birth?

H. C. THOM—Yes, I think that is true, but I don't think it is well to lay it down as being an infallible recipe for it. If a man will oil his hand or wet it and go to the back part of the cow and insert his hand he will find this after-birth fastened to the uterus of the cow, and he can tell, if he is at all delicate of touch, whether it is tearing or coming off naturally; it will drop away. If a cow retains her after-birth three or four days it will take her three or four months to get her milk back into good condition.

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# FALLACIES IN BREEDING.

By GEORGE W. WYLIE, Leeds.

In the limited time at my disposal it is impossible to even briefly allude to the many fallacious ideas connected with the breeding of our domestic animals. Such ideas as, controlling sex, the influence of first impregnation, effect of imagination upon the color, aged sires bred to young dams, and young sires to aged dams.

The outward confirmation of the sire and the constitution and disposition of the dam being imparted to the progeny, and many others that might be mentioned, are conceded by careful, intelligent observers and practical breeders to be largely fallacious. But the particular fallacy that I wish to allude to at the present is that of breeding in and in.

### Breeding In and In.

Incestuous breeding at the present time is an entirely different thing from what it was in the days of the early improvers. They bred in and in to fix a type and from animals of no previous affinity, while to-day we are using animals of the same general type and full of the same blood to begin with. That the early improvers by breeding in and in took the quickest possible method of fixing types, and establishing breeds is

probabably true. That by persistent selection without inbreeding the same results might have been accomplished, is just as true, but it would have taken longer time. The early improvers considered inbreeding and the keeping within certain prescribed limits of blood necessary to fix a type or establish a breed. But when representatives of a breed have become so numerous that there are different families and branches of families, strains and sub-strains, all belonging to one breed, the necessity for inbreeding with that particular breed would seem to have ceased to exist. If all the excellence of any one breed were wrapped up in one family or strain, then perhaps, the necessity for inbreeding might for a time exist. But this, I believe, is not the case with the large majority of the breeds with which we have to deal to-day.

And any method of breeding that tends toward a weakening of the constitution, the transmission of disease, infertility and barrenness, must be considered dangerous. An animal or a race of animals lacking in constitutional vigor and substance, is like a house whose foundation is on sand. There is perhaps no class of breeders who have had more experience with inbreeding than the breeders of some strains of Shorthorn cattle. For 30 or 40 years past a good number of them have been working with some pet strain of this breed trying to produce something phenomenal by breeding in and in.

### Out-Crosses Preferable.

While these men have been working in this way, Amos Cruickshank, over on the bleak hillsides of Scotland, by a judicious system of out-crosses, with only individual merit backed by a good pedigree to guide him, has produced a family of Shorthorns of such excellence individuality, constitution, and substance, that in comparison the inbred weaklings on this side almost look as belonging to a different breed.

When Gen. Sherman struck out on his famous march to the sea, he made a departure hitherto unknown in modern warfare; and when Amos Cruickshank left the beaten path before pursued, he demonstrated to the world that inbreeding to obtain individual excellence is a fallacy as far as Shorthorn cattle are concerned.

The result has been that there are no better selling cattle among Shorthorns at the present time than the Cruickshank's, and that there are fewer advocates of inbreeding in the Shorthorn camp today than ever before.

There is perhaps no stronger argument against incestuous breeding than that found in the thoroughbred or running horse. He has been bred as a distinct breed for over 150 years and inbreeding in his case has always been strongly opposed as it was found whenever tried to weaken his constitution and impair his staying qualities. Here we have the purest, the most prepotent, impressive and distinct race of all our domestic animals brought to this present high state of perfection without inbreeding in any form. And today he is superior to all other breeds in speed and endurance.

### A Model Breeder.

The man who above all others is held up as a teacher to be followed by advocates of inbreeding is Thos. Bates. But any one who will study the career of Mr. Bates as a breeder will find that he was not strongly in favor of in and in breeding, but was compelled to practice it in the early part of his career from the force of circumstances—as at that time,

no where outside of his own herd could he find animals of sufficient merit, and of the type wanted to infuse fresh blood into his stock. But when this method of breeding had been carried to such an extent that in a single season 28 of the calves died, supposedly from a lack of constitutional vigor, Mr. Bates made a radical change in his operations. He abandoned inbreeding and never returned to it. And it was not until he had done this that he began to win fame in the show yards of England.

Any one who will carefully analyze the life work of Thos. Bates, will discover that any arguments that may be drawn from his operations in favor of inbreeding are not particularly convincing.

### Theory Instead of Practice.

At the present time we have three classes of men who advocate inbreeding. The first class that I will allude to are theorists without much of any practical experience in this particular line, they have what they know on this subject largely from books. And while I do not wish to be considered as questioning the value of information derived from books, it must, however, be conceded that as regards this subject some practical experience is necessary to a thorough understanding of the situation. These men can work no great amount of damage to any live stock industry, except so far as they may from the plausibility of their theories be able to impress upon some new beginner the necessity of inbreeding.

### Breeding Trotting Horses.

The second class may be found in the ranks of those who are breeding the American trotting horse. With this class a few fast fliers have been produced in about the proportion of one success in one hundred failures, but the breeding methods practiced by trotting horse breeders are mainly of a different character from that practiced by incestuous breeders among cattle, for instance some of the sons and daughters of Rysdick's Hambletonian have been "out" for two or three generations and then the streams are brought together after being diluted with a large proportion of other blood; in very few cases have the extremely close methods advocated by some cattle breeders been resorted to in the trotting horse thus far. But this breed at present is largely formative and it is, perhaps, too early to draw conclusions; if inbreeding is justifiable anywhere at the present time it is so with the American trotting horse. The third and last class that I will mention may be found among breeders of dairy cattle, some of whom are strong advocates of inbreeding, and their teachings, if adopted by the masses are positively dangerous. I have already said that constitution is of the first importance, the dairy cow may be an exception to this, but as far as my personal observation and experience goes she is the animal above all others that should from the nature of the demands made, have a robust constitution. The breeding of sire to daughter may be the best possible methods to fix a dairy type; but if that method increases the dairy qualities and weakens the constitution what have you gained. If it were possible by inbreeding to increase the dairy qualities and at the same time increase the constitution to enable the animal to back up those qualities, there would be some reason for this kind of breeding. In these days of high pressure and push dairy animals must have constitution, and if there is any one principle of breeding that has been clearly demonstrated it is that increased constitution

in any race of animals is not obtained by breeding in and in.

**Lessen Constitution.**

Some of the most cautious advocates of inbreeding advise that if two animals have strong constitutions no harm can come from breeding them together. Yet they admit that to do so will lessen constitution, but add quality to the progeny. Quality today is not so scarce an article as formerly, and experience would seem to teach that it would be much safer to hold on to what constitution we may have, and reach out and add the necessary quality by the infusion of fresh unrelated blood of equal or if possible greater merit. The advice of advocates of incestuous breeding is farther reaching in its effects than most of them appear to think. Questioned closely they usually admit that not one man in fifty has the necessary qualifications to make it a success. But the economical side of the question is quickly grasped by the masses, and men who may be owners of but one pure bred animal will conclude that they possess the requirements of that one man in fifty and will practice incestuous breeding accordingly.

**Look Forward.**

Advocates of this kind of breeding are always looking backward and pointing to the success of our fathers and grandfathers in this field. But conditions are entirely different today, and different conditions require different methods. Our fathers may have been good farmers but it is generally conceded that improved methods in their day would hardly be successful now. How much less then is the breeding methods of our grandfathers applicable to the changed conditions of the present time. "The world moves," no one man or set of men have a monopoly of the best animals or strains in any of our improved breeds. The necessity for inbreeding has ceased to exist, and the breeder who seeks first constitution in the animals he breeds, will have all other things added unto him.

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# PRINCIPLES OF BREEDING.

By Gov. W. D. HOARD.

Mr. Chairman and Gentlemen: I think every farmer will admit with me that it would be an advantage to him if he was a good student of the principles of breeding our domestic animals. Now, we have, for instance, too low an average of domestic animals in this state. To what does this trace? In my opinion it traces to the lack of intelligent study on the part of the average farmer in producing a good animal. Breeding is the foundation; feeding is the finish. We have, for instance, so poor a lot of cows in this state that they do not average 125 pounds of butter apiece for the year. Yet Mr. Goodrich has a herd of cows that average over 300 pounds. How did he bring his herd of cows to that average? They produced one year 357 pounds of butter apiece. How did he

get them to do this? Why, he started right. He commenced by laying the foundation of a butter cow. How? By better breeding, by being intelligent in the use of principles that lie at the bottom of all butter breeding.

Principles are the tools of the breeder. He must understand how to use them. In order to acquire understanding he must study, not only the work as it lies in his own hands but the work and experience of others.

### Application of Principles.

Another man has a sheep and the carcass of that sheep would weigh say 70 pounds. I saw a lamb in Canada two years ago eight weeks old that weighed 70 pounds. What is the difference between the two animals? One is a product of intelligence in breeding and treatment, and the other a product of a lack of intelligence. Now, we have a low average of beef cattle, of dairy cattle, and of mutton sheep. We have a better grade in hogs than in anything else. One reason for that is that there is no other use that you can make of a hog except to kill him. Greeley said the poorest use you could make of a man was to hang him, but the best use you can make of a hog is to kill him. No one ever heard of a general purpose hog, except down in North Carolina. There they produce a hog that I know from experience will outrun a horse. I have run a horse after them, and the hog would always keep a good healthy distance of fresh air between himself and the horse, until he got tired and then he would dart into the woods out of the way of pursuit. A man once went to North Carolina with a lot of Berkshire hogs to exhibit them at the state fair. He noticed that everybody was passing by and looking at the razor-back hogs. He said to a North Carolina farmer, "What is the matter with the people? You don't seem to look at my hogs at all." "Well I reckon not, sir," said the North Carolina man. "What is the reason; don't you want this kind of hogs down here?" "Well I reckon not, sir." "Why?" "Well we'uns want a kind of hog that will outrun a nigger." If they don't outrun the negro the man don't own the hog you know.

With all our farm amimals there is a serious lack of the principles of breeding. I want to call your attention to some of the facts that show that very plainly. The trotting horse men do not lack in a study of how to produce a trotting horse, nor the draft horse men in the study of how to produce a draft horse; neither does the bird-dog breeder, or the fox hound breeder, lack in study. Why? Because they hold steadily to the principles that are in line with the animal's function. No fox hound breeder mixes up his breed; he never goes to crossing with the mastiff, or the bull-dog, or the shepherd dog, with the idea that he is going to get a good fox hound. Yet, the average farmer in Wisconsin has no other idea to-day but to make hash of his breed. He crosses here and there and everywhere. One man said at an institute, one day, that he had started with Merinoes, and crossed with Cotswolds and then crossed with Oxfordshires and then he crossed with Shropshires, and says he, "My sheep ain't worth anything." I was a good deal struck with the vigor of the man's statement. He says, "They are neither worth anything for wool nor for mutton." That is one conclusion I want to present to you.

### The Necessity of Strong Lines in Breeding.

If I want to pull a bell at the top of a building and make it ring, I have a rope. Supposing that rope was made up of

a strong piece of rope one foot long, a rotten piece of cordage another foot and the line up to the bell was broken in two and simply tied together so as to barely hang together, and that there was no straight, strong rope clear to the bell—I couldn't ring the bell, because if I laid hold of it vigorously I would break the rope. I couldn't pull, for the result that lies way back at the end of the rope. That illustrates line breeding. What is needed in Wisconsin to-day, is for farmers to begin to study more particularly into the value of line breeding, breeding in line for what we need, and not break up that line by foolish crosses; we make hash if we do. You cannot make chopped straw into a good strong band. Chopping up breeds produces the same result.

### Pre-potency.

What is breeding based on? It is based on heredity. We use another word, potency or pre-potency. Mr. Wylie spoke of inbreeding as establishing potency. The Jew is the most wonderfully in-bred man of all men on earth. He has been in-bred from the very day he left the Egyptians. You may breed him with any race on earth, cross him with any woman in the world and the child will be a Jew, more than anything else. Now those are principles that apply right here, just the same with animals as with men. What is the reason of that? Because the Jew has established a type so potently and powerfully that the moment the current of his blood strikes the current of her blood the Jew current takes possession of the other, and the result is a Jew. Now, that is a valuable thing to study on; that is the meaning of pedigree. Some men sneer at pedigree, and say that it is worth nothing. Pedigree has a long number of agreeing bloods behind it in line. Men need not only a good specimen of the individual animal but they need a long line of fathers and mothers of the same line of characteristics, so that there is a constant agreement and augmentation and enlargement of the functions for which the breeding is done.

### Power of Assimilation.

It is a well known fact today that if a Texas steer is given a quarter of a bushel of corn meal as his ration, and you take a Shorthorn steer and feed him the same quantity, and you will get very different results. Why? Because the power to assimilate food and produce meat has been bred into the Shorthorn and by a constant, slow process built up. The Texas steer has never been bred for anything except to get over the ground, and I know from experience that he can do that. I once had three hundred of them chase me two miles across a prairie, and if a man is to be judged by the enthusiasm of his following, I was the most popular man ever seen in Texas.

Now, there are certain principles that I want to bring out in order to show that the farmer needs to study them. Why? Because his money and his living and his profit are in these animals, and yet he seems to think that nobody but the breeder ought to study breeding. Why, the farmer is the man that is to make the money out of the farm in Grant county. It is the average farmer that has to produce the animals of the county, not the breeder. Therefore, the average farmer should be just as wise in producing a good animal as the breeder. He should be a breeder.

### Law of Heredity.

Now, take dogs, for instance. They are a favorite illustration of mine because it is so clear on this question of heredity. Take a setter and a fox hound;

both have noses equally sharp. And yet hundreds of years back wise men began to breed one dog to smell birds alone, and the other to smell four-footed animals alone, and so well have they succeeded that the setter dog is almost oblivious to any other scent but the scent of the bird. You may take him out into the field to hunt birds and he may run across a thousand fox tracks but he does not know it, because he is there to smell birds alone, as the trotter is there to trot and do nothing else but trot; like the mutton sheep which is there to produce mutton and nothing else but mutton, practically. That is the object of his being. A fox hound will cross a thousand bird tracks and he does not know it. It is not for lack of capacity to smell but because his heredity is not in that line. But the moment he strikes the fox-track, *for which he was bred*, for which he was born, that moment he answers quickly; he has found that which he was bred to find.

Now, I want to call attention to foolish policy the farmers of this state pursue. You do not find dog men acting as foolishly as farmers. No boy fifteen years old would ever undertake to go hunting foxes with a bird dog, or birds with a fox hound, or either with a bull-dog. And yet we have thousands and thousands of farmers in this state that are trying to make butter with beef animals and trying to make beef, with butter animals. The average production of our cows is a disgrace to Wisconsin intelligence. I tell you, my friends, it is not feeding so much to-day, as it is intelligent shaping of these animals for a purpose.

**Breed vs. Feed.**

An old man jumped up one day in an institute and says, "You may talk as much as you have a mind to about breed, I say the breed is in the corn crib," one of those truths that are partly true and yet not true. I said, "If your words mean anything at all they mean that you don't pay any attention to breed, but everything to feed." "Yes," he said, "that's right." "Very well," said I, "you are the man I have been hunting for for years. You have got a short cut to success, and I want to get it. It doesn't make any difference what the breed is; it is all in the feed?" "That's it," he said. "Very well," said I, "do you remember that razor-back hog we had here thirty or forty years ago?" "Oh, yes," he said. "Now," I asked, "how would you feed that hog so as to make a Poland China of him?" He looked a little staggered. I added, "How would you feed a race horse to make a draft horse out of it? How would you feed a Jersey cow to make a Hereford out of it?" "Well," he replied, "you may talk as much as you have a mind to, but I believe just what I said." Now don't you see, that too many of us are not teachable. We come together on these questions and every man has his own opinion, and would stick by that notion as he would by his own wife, though some men fail them very easily. Remember that breeding is a matter of principle, it is not a matter of experiment.

**The Law of Transmission.**

Just the same as we take up arithmetic to day and proceed to do a sum in addition according to principle, and do a sum in multiplication according to principle. You built this town hall here according to the principles of architecture; every single stick has been thought out and a principle applied. So it is with our domestic animals. We will take for instance dairy cattle. Some of

the opinions that our farmers have about dairy cattle stand right in the way of their success; for instance, that size is essential in a dairy cow. Now, that is a fallacy. You don't send men to Washington according to their size. You don't believe today that learning goes into a man's head according to his size. If you do you have got some tremendous big fools and some very smart small men to oppose that notion. In the dairy cow you are after a specific exhibition of talent and you need breeding to assist you in that matter. Here is a bale of hay. On one side comes a running horse, on the other side a draft horse, on this side a dairy cow and on that side a beef animal. Now, there is just exactly one kind of feed, yet in one case it produces speed, quick, fast action, in another, slow, strong action, in another it produces butter and in another beef. At another bale is fine wool sheep and mutton sheep. You see the difference in the result. What is it that turns the result off like a switch down these different tracks; what is it that takes the same car and shoots it upon one track or another? It is breed.

#### A Thoroughbred Sire.

What is breed based upon? Upon function, capacity, talent. How shall we apply it? By a study of the different kinds of those talents, but the principles that govern their reproduction are all alike. Now, one of these disadvantages that we labor under as farmers, is, that we are not sufficiently educated up to the idea of a thoroughbred sire. The thoroughbred sire is a sire that has received like a river a lot of streams from the mountains on either side running into him to swell the potency of his blood, and that all in one line. A thoroughbred sire is so full of prepotency that he impresses himself upon his progeny. For instance, breed a native cow with a thoroughbred Holstein bull; he has had so many years of breeding in a distinct line that he invariably marks the calves black and white. You may examine the progeny of a thoroughbred Holstein bull and I will guarantee that you will not find one calf in a thousand that will not be black and white. What is it that we call "potency?" Why doesn't the native cow have it? Because her heredity is all broken up. She can't impart it. Take a thoroughbred Holstein bull and a thoroughbred Jersey cow and you will find there that potency wars with potency and you will secure a diversity there that you have not seen in the case where the cow was a native and consequently of less potency.

#### A Dairy Cow.

Suppose we want to produce a dairy cow. Let us start in by taking native cattle and putting a thoroughbred sire at the head, take an Ayrshire or a Holstein. The Shorthorns today in the west are not valuable for the dairy. We have some very fine milch cows among them but let me ask you where you will go in the west for a Shorthorn bull that will throw strongly and prepotently on the side of the dairy? In England you can find them and in the east you can find them. On the Wadsworth estate in the Genessee Valley is a herd of Shorthorns, started over 50 years ago and they have been bred for milk until today the males are potent in that line; they are not as profitable as beef animals, as those bred specially for beef. As the beef potency increases the milk potency decreases.

You want to raise the best kind of a dairy herd. This is what I would do. I would go among the farmers and select

the best native cows I could get. I would want them to be of the dairy form, every one of them. If two cows of equal merit were brought to me, and one should give even more milk than the other and yet was of a beefy form, I would not breed to her, because a cow breeds very largely from her blood and not from her udder. Many a beefy cow has been a famous cow but she wouldn't breed that way. Mr. Goodrich had a celebrated Shorthorn grade cow and she had three heifer calves, but none of them were worth anything for the dairy. A good many farmers have the idea that a good cow individually will surely breed that way. She will not always Many a beef cow gives plenty of milk but hasn't a dairy tendency in her. Take a cow with a breeding tendency towards dairy work. Then I would couple her with a thoroughbred bull. Then I would take her heifer, if it was a good one and of strong constitution, and breed that heifer to her own father. I would determine the constitution a good deal by make-up and by the development of the navel, which I think is the finest test in the world of constitution; the strong muscular condition of the navel. By breeding that heifer to her own father I would get a three-quarter in-bred, say Jersey, or Guernsey or Ayrshire or Holstein. That is as far as I would go with in-breeding. Then I would have so enhanced the potency of the sire's breed in that heifer by that one in-cross as to make her almost as potent for the reproduction of that breed, as though she were a thoroughbred. These are some of the principles that I would use. By this process I have seen herds where the grandmother was a 125 pound cow brought up so that the daughters and grand-daughters made 375 pounds of butter. The difference in feed wasn't so much but the difference in breed was very great.

### Constitution.

I will speak about this question of the navel as an indication of constitution. What is constitution? It is not hardiness. You hear men say, I want a hardy cow. They don't want a hardy cow; they want a cow with a good constitution. The cow you want should be a cow that can endure large dairy work—not bear exposure—but take her food and do large work in the dairy line. A cow ought to have constitution, but you don't want the mother to have hardiness like the bullock. There is a most important distinction between hardiness and constitution. Constitution is something that you can't feed into men; neither can you train it into them. How do you get it into them? It is something that his mother gives him—tenacity and vitality of life. As a soldier, I have noticed some clerk from out of a country store go into the ranks alongside of a burly-built fellow; I have seen them start right even on the march together through the swamps, and have seen the big man go down and the delicate game-cock little fellow come up. What caused the difference? I have seen hundreds of such instances, any old soldier has. The difference was in constitution, not in strength but in vitality and endurance. One of them resisted disease and rose quickly from fatigue; the other went down.

### An Army Surgeon.

The first I ever saw of this was in watching a regular army surgeon select men for the army. I saw him reject a man of splendid shape. I asked him why he did so and he said: "The man has no constitution." I asked how he determined that? He said: "Look at

the navel." I examined. The man had a flabby, irresolute expression of the belly and thin at the navel, and the whole expression of the abdomen indicated weakness. He would break down at the first exposure. I said, "Doctor, how do you explain it?" He answered: "Constitution is something that a man's mother gives him." I want you young men to remember this because it is something which will be of use to you in your study of animals hereafter. Constitution is something that the mother gives. Life is sustained through the umbilical cord. The mother when carrying the fœtus supports the fœtus entirely through that organ. The whole fœtal circulation is there; the combined circulation of the mother and the fœtus is through the navel. Now, if that channel is weak, small or contracted, it necessarily imparts a weak condition of vitality to the fœtus. If it is strong and full, and has a strong expression as you put your hand upon it, it is a clear indication that the mother has imparted a strong constitution to her young. Physicians will tell you that they have noticed when children are born, that where the umbilical cord is weak and small, the child seems to have a low vitality; where it is short, thick and strong, that child comes into the world with a whoop, he is on deck; he is ready for whatever this world has to give him, and he has vitality right through. These are vital facts. I have never laid these facts before a physician in my life that he didn't say, "I see it," and has brought me agreeing and concurrent experiences on the matter. I asked the army surgeon: "Have you ever applied this to animals." He replied, "I have with horses and I never knew it to fail." I then took up the study in cows.

Constitution does not mean talent for beef, or milk; it does not mean anything but ability to bear strain. I took 3,000 different cases and studied every one and in every instance where I have found the navel to have a firm, strong expression I found that to be a strong cow. I have the data of that study to-day. I have not found any exception to it.

If there is anything of value to you in this talk, it is most respectfully and heartily submitted.

# DAIRY SESSION.

## HOW TO MAKE A DAIRYMAN OUT OF THE AVERAGE FARMER.

By T. J. FLEMING.

The average farmer with his average herd of cows in number and quality, with the average skill and dairy intelligence, and average dairy manufacturing facilities, is a doubtful subject for success, in the opinion of practical dairymen. Yet, from such a combination as this have arisen the exponents of far-famed Wisconsin dairymen. And what has been the system or line of action through which this reputation or success has been attained?

By looking over the fields of labor traveled by them, we will be materially aided in the rather necessary undertaking.

Do we find them beginning dairying by disposing of all the cows on hand and replacing them with thoroughbreds? By no means, they did not begin that way, nor do we find scarcely any of our thoroughly practical and successful dairymen of to-day using that character of cow. What then! surely you can't mean the scrub cow? The term scrub I don't like, and believe it is often misplaced. It should be *native cow* and scrub owner, feeder and handler.

We take an unwarranted stand when we say our cows will not pay their keep, unless we have given them surroundings and treatment under which only they are capable of showing their possibilities.

**Better Cows.**

And I believe a cow's capacity to produce milk in quality as well as quantity can be developed by food, care and handling, just as the trotter is brought to his greatest capacity to trot, by the judicious manner of feeding, caring, handling and developing. Therefore, fellow farmers, let us not discard our cows on hand, if the treatment of these animals in the past has been of that character not calculated to develop. Nor are we qualified to pass judgment on a cow's possibilities after a week's good treatment, because it takes a longer time to change her from an inferior to a profitable animal. And we should, if she shows any susceptibility of improvement in that time continue in the same direction until we have established her identity for or against profit. And when this is done, let us be as quick to discard, if unprofitable, as to retain if profitable.

Now, my friends, I am morally certain that the percentage of cows in Wisconsin capable of yielding a profit under favorable circumstances, is much larger than estimated and far beyond the actual number paying profit, owing to the injudicious and culpable treatment they are receiving at the hands of their owners. And while I am willing to concede the advantages to be derived from the infusion of better blood into our dairy stock, I do not believe that it is absolutely

necessary or the first essential for the average farmer to rush into.

#### Improve Your Cows.

What then, should he do? Instead of milking his cows about seven months, milk them ten to eleven. Instead of turning cows to pasture May 1st, with the regularity of the change of seasons turn them when the grass has well covered the ground and attained a good height, at which time it is capable of developing permanent and rapid growth. While on the other hand if we turn to pasture while the plants are tender and spindling, having no avenues or channels through which to draw support or plant food, except its slender roots penetrating the cold, wet soil, the pasturing will check this growth by biting short those tender plants, and treading under foot even more than they consume. Bear in mind that there is no known single food which will put a cow at her best.

#### Add a Grain Ration.

Even our best pastures in my own experience, can be improved by feeding a grain ration, and now, as grain is so cheap, will we not give it a trial for the purpose of establishing an experiment? Couple with this good feed and plenty of it, free access to good, pure water, and salt, never losing sight of the fact that milk is materially influenced in quality and quantity by the judicious or injudicious use of these two milk producing elements. Then cultivate in your animals the principle of docility by your kindness to them, milk at regular intervals with clean, dry hands, quickly strain and remove milk from contaminating influences, aereate by dipping or pouring while at its normal temperature if intended for butter making, where the centrifugal process of creaming is used, and especially should it be aereated before cooling when intended for cheese-making. But, why confine the treatment to those two systems? Because I believe them to be the only practical and profitable systems for the average farmer to follow.

#### Winter Food and Care.

A word about winter food and care. This feature of dairying is neglected because we have not brought ourselves to realize the advantages and profits derived therefrom.

We should remember that there is nothing in the organic make-up of a cow, which prevents her from being a profitable milk, butter or cheese producer in winter any more than in summer, if we only give her summer surroundings.

But bear in mind that success can only be attained by the average farmer who puts intelligence, thought, study and 365 days of the year into his business.

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### DISCUSSION.

L. H. ADAMS—Isn't it a fact that the low yield of milk is the reason there is so little profit found in the milk business?

T. J. FLEMING—It is undoubtedly, and I think the cause of that low yield of milk is largely owing to the poor care given our animals. I would state in corroboration of this, I have what you would call scrubs, natives; four years ago they would produce only 3,000 pounds per cow. I have those identical cows in my herd to-day, with their offspring, of course. The past year, including old cows, some past their eleventh year and others in milk for the first time, and I have, through nothing more than judicious care, treatment and good food, raised the milk producing capacity of those cows to six thousand pounds of milk. Now, I don't bring that up as any

reflection on breeds, but simply to show that there is a great deal more in the cows we have upon our farms than is commonly imagined; we have not given them a good trial.

GOV. HOARD—Are you not in danger of leaving clear out of sight the distinctive difference there is in cows; don't you think if you were to take a herd head by head and test each cow, that you would find a great difference in those cows?

T. J. FLEMING—Undoubtedly.

GOV. HOARD—I have found by tests that, in one case, one good cow gave me more clear profit than fifteen scrubs; I was carrying fifteen scrubs to get less profit than I could get from this cow.

T. J. FLEMING—I believe we have arrived at that time when many of us are forced into dairying. Are we going to wait until we can raise a herd of the offspring of thoroughbred animals? We have got to start in with the cows on hand. I believe in putting at the head a registered animal; I don't say that we should raise every calf of his getting either, by any means. I think it is a mistake to select calves simply on the ground of the size of the dam.

GEO WYLIE—Can a man hope to make a successful dairy farmer unless he reads dairy literature?

T. J. FLEMING—I don't think any dairyman can be a successful dairyman who does not read dairy literature, who does not read the experiences of those men who are making dairying a success.

GEO. WHICHER—Is it not a fact that the cow that has the most generous feed will make the most milk?

T. J. FLEMING—The milk of a stripper I know is richer than of the same cow when on a full flow of milk.

GEO. WHICHER—When I speak of their running down in the quantity of milk in consequence of poor feeding, isn't the milk of poorer quality?

T. J. FLEMING—I wouldn't say it was of a poorer quality. If a reduction in the flow of milk is brought about by starving instead of by drying the cow up, then I don't think the milk would be richer.

SUPT. MORRISON—Do you think you can improve the quality of the milk by the feed?

MR. FLEMING—Yes, sir, I do.

GOV. HOARD—Can you make a cow that constitutionally gives poor milk, give good milk by giving good feed?

MR. FLEMING—I can improve upon it.

GOV. HOARD—Every cow is born with her certain limit, a certain limit of percentage of butter fat per hundred pounds of milk. Understand me clearly; one cow is born with a limit of say three per cent. of butter fat as a limit to a hundred pounds of milk; another cow is born with a four per cent. limit; another with a five per cent., and another with a six per cent. limit; that must be true or you would not have these differences in cows. These individual differences in cows are individual differences of limit. A cow that has an undeveloped limit can be developed by feeding; but the cow that has gone to the extent of her limit cannot be made to go a single ounce further; that has been fairly well demonstrated by experience.

QUESTION—Do I understand you that a cow that has a three-pound limit as a net amount of butter fat in a hundred pounds of milk cannot be made to increase that?

GOV. HOARD—If that is her limit.

C. R. BEACH—Can she be starved so she won't give it?

GOV. HOARD—Yes, sir.

C. R. BEACH—When she has been

starved you can turn around and increase it, can't you?

GOV. HOARD—Yes, sir.

QUESTION—How do you know when you have reached the limit?

GOV. HOARD—When you can't get a cow to make any more milk; she grows fat and she won't give you any larger per cent., then you may know you have struck her limit.

T. J. FLEMING—I don't think there are many of our farmers who have been feeding in a way to determine that limit, and that is a point I wish to impress upon you. I do not wish to take issue with Governor Hoard from a theoretical standpoint; but the fact that we have not been feeding in a way to bring our animals up to that limit, is all the more reason why we should attempt to do so hereafter; I think it is worthy the trial of every farmer in this room.

GOV. HOARD—Have you made any experiment, Mr. Fleming, with the solids in the milk of your herd to know whether you have doubled the amount of cheese that they will produce?

T. J. FLEMING—I have; that I know to a certainty.

GOV. HOARD—Have you made up the milk separately?

T. J. FLEMING—In the winter season I have; I have a partition in the vat and make my own milk in one portion, and the other milk in the other portion.

C. P. GOODRICH—You say they can be developed to a certain limit, but the question is, where is that limit; it depends on the age of the cow. A cow at four year old can be made to give more and better milk than at three year old, and at five can be made still better. When do you reach that limit? I think she can be improved until she is eight years old by the right kind of feeding and development and she will continually give richer milk.

H. C. THOM—Do you know that when that cow of yours that gave 375 pounds of butter in a year, that she was giving a larger percentage of butter fat than that same cow when she gave 250 pounds a year?

C. P. GOODRICH—No, I don't think I do.

GEO. WHICHER—I know that if you take a herd of 40 cows and feed them on hay and give them a generous feed of it, and they will make more cheese per pound of milk, they will make a bigger yield than on lighter feed.

L. H. ADAMS—To go back to the question of improving our native cows which we left some time ago. It has occurred to me that the rapidity with which we progress in this direction toward better cows, is limited to a large extent by the cheese makers, and the fact that there is not a proper incentive among cheese makers and farmers who sell milk for cheese purposes toward better methods and better cows.

T. J. FLEMING—There is an incentive, in my opinion, for the milk producer to produce good milk only when he is a patron of a co-operative factory or creamery. It is immaterial which. Although we have not many of these co-operative factories at present, it will be in a short time so that milk will be made up for exactly what it is worth; if there are four per cent. of butter fat in the milk of A's cows and only three per cent. in that of B's cows, they will be paid accordingly.

L. H. ADAMS—Will it take so much preaching then as now to elevate the standard of the cows?

T. J. FLEMING—No, I think not.

GOV. HOARD—I have had some experience with these different kinds of cows.

We made 12,000 tests in our own creamery in one year and I tell you, my friends, there is a vast difference in cows.

We had milk brought there from one herd of cows which yielded only 2.61 pounds of butter fat to a hundred pounds of milk; to be sure the man didn't feed them well, but he corrected their feed afterwards and fed them well, but they were a low order of cows. Now, if there was no difference in cows in constitution there would be no use in breeding; there would be no particular advantage in breeding cows if feeding made everything; but we see that breeding establishes a foundation and by wise feeding we help to enlarge that limit. But I know myself that we have had men bring us milk that contained nearly six pounds of butter fat in one hundred pounds of milk, and we have had other men bring us milk that contained only three. Now, in that case one man's cows were earning nearly or quite double what the other man's cows were earning, and yet the division had to be made on the pound.

T. J. FLEMING—I don't want to be critical, but we all concede that a stripper puts a larger quantity of solids into her milk than when she is in full flow.

GOV. HOARD—Do you mean per day?

T. J. FLEMING—Yes.

GOV. HOARD—No; a cow will give you fifty pounds of milk a day in June and she will give you a pound of butter; she will give you twenty-five pounds of milk in October and a pound of butter; now she does not put any additional richness in that milk, so much as the fact that she has decreased the water; there is a larger percentage of solids in the twenty-five pounds of milk; but there is not a larger amount per day. Suppose Morrison has a cow, Thom has one, you have one and I have one; in June we bring fifty pounds of milk apiece to the factory, and in the fall we bring twenty-five pounds a day; the milk makes in June the same amount of butter that it did in the fall, but the cow secreted no more solids per day than she did in June.

T. J. FLEMING—She did per hundred pounds of milk.

GOV. HOARD—That is true.

ORANGE JUDD—Do I understand Gov. Hoard to say that you get from 100 pounds in October as much butter as you do from 200 pounds in June?

GOV. HOARD—I have known cows that would give just as much butter in October as in June, when they were giving only half as much milk as they were in June.

ORANGE JUDD—Do you get as much butter from 100 pounds of milk in October as you do from 200 pounds in June?

GOV. HOARD—Not always; but often we do, in certain herds. Oftentimes you will find a man bringing milk in June that double the amount of milk produces no more butter than half that amount of milk in October.

# HOW TO REAR A DAIRY HERD OF COWS.

By C. P. GOODRICH, Fort Atkinson, Wis.

### Some General Principles.

"Train up a child in the way he should go," is certainly good advice for the human family. It is just as sound advice to say, "train up a heifer calf in the way she should go when she becomes a cow."

Now if she is intended for a dairy cow she "should go" first, "in the way" of consuming the best milk producing foods, and second, of converting these foods into the largest possible quantity of milk, rich in butter fat—the fat being the chief valuable part of milk. Then feed your calf just such foods in order to train her organs of digestion and assimilation so that when she enters upon the real business of her life, she will be able to convert as much as possible of these foods into rich milk. Feed your calf liberally so as to promote rapid growth and development, but avoid feeding so as to make her excessively fat. For in this there is danger of forming a beef tendency and habit, so that she will even take on the beef form to a certain extent more than she otherwise would, and quite likely divert too much of her food into the wrong channel for a dairyman when she becomes a cow.

I believe if a dairy cow, which had been proved a good one, should from accident or otherwise be dry for several months, and in the time become very fat, her usefulness as a dairy cow would be permanently impaired, the habit of turning her food into fat would be, in a measure, fixed. And further, I believe that this change would extend to her progeny, so that the calves produced after the change would not be as valuable for the dairy as those produced before. If this were not true, how is it that we have such a great variety of types among our domestic animals that are all descended from one source? Food and care make changes and create types; then breeding and feeding perpetuate them.

C. R. Beach once said, "You feed a common cow like a Jersey and you will think you have got a Jersey." And he might have added, you feed a Jersey as you would a beef animal, to produce the most fat, and, though you may not think you have got a Shorthorn, you will turn her somewhat in that direction, or feed and treat her as some men do a scrub, and soon all you will have left of her will be her hide, because she has not been "trained" to stand hard fare and starvation.

A prominent Jersey breeder who, by the way, has as fine a herd of Jerseys as I have ever seen in the state, was one day showing me his cows. There was one which, although she had the Jersey color and markings, had more of the form of a beef animal, and was very fat. He said she was one of the very best bred cows he had, and at one time was excelled by none in butter production; but one year she failed to breed, and the manager of his herd not understanding the situation dried her up. She was nearly a year without giving milk, and in that time laid on a great amount of flesh. She had ever since been nearly worthless as a dairy cow, and he believed that she had permanently changed her form. He still kept her for breeding purposes on account of her pedigree—the

blood that was in her—thinking that her progeny would be valuable. In this I fear that he is mistaken, and that her progeny will in a measure partake of her character as it now is. I once had a similar experience. My cow, which was an excellent butter cow, was dry several months, and being well fed in the time, accumulated a great deal of flesh. I supposed that when she came in she would do better than ever on account of the extra flesh. I thought she could draw on it for butter, or, at least not require so much of her food to support her, and could turn more of that into butter. But I was mistaken. She did very poorly that year, and has never yet come up to her old standard.

These are some of the general principles, briefly stated, which from known facts, and my own observation and experience, I believe to be true, and an adherence to which will greatly aid one in rearing a dairy herd.

It must not be inferred that I place a light value on breed, but that I wish to emphasize the fact that feed and care can work changes in any breed; that by these means the common stock of the country can be greatly improved; also that the best breeds can be made to rapidly deteriorate. Because an animal is a registered Jersey or a Guernsey is not proof positive that he or she is a good dairy animal. A poor Jersey cow (and there are such) is worth no more than any other poor cow.

### A Poor Man.

At the close of an institute held in Jefferson the last of February, a man said to me: "I have come a long way to attend this institute, hoping to learn something that would help me, but I am disappointed. The talk was good enough, but it takes money to do as they say. Rich men can do it, but I can't. I'm poor." After a little further conversation I learned that his case was like this. He had lately bought an 80-acre farm and was $2,000 in debt on it. His entire stock, besides his team, consisted of 6 young cows and 2 yearling steers. He had enough good hay to keep them through the winter, but no grain that he could spare for them. His cows would come in in the spring. He wished to work into the dairy business as soon as possible, but he positively would not run in debt another dollar. It occurred to me that I could do no better on this occasion than to take up his case and work out the problem for him, and demonstrate how he or any other man similarly situated could in a few years, rear a good dairy herd of cows. My feelings are the more deeply interested in this case, because the time when I was in a like position is not so far in the past, that I have not the most vivid recollection of it.

### Demonstration.

First, sell the steers for whatever they will bring. Sell the hay that it would take to keep them till spring. With part of the money buy some feed, equal parts bran and oats. Begin immediately to feed each cow a small ration, say 4 or 5 pounds a day of this, with all the good clover hay they will eat, with cornfodder and straw, if you have it, to make a variety, until four days after they come in. Then gradually increase the grain feed till each cow has 12 pounds a day. The extra amount of milk from feeding the grain will pay more than double price for it. Raise all the heifer calves, and buy enough more to make as many calves as you have cows. Go to some dairyman who has been grading up to Jerseys for some years, and has yet left some—of course the best—of his common cows. Their calves will be half bloods, and he will sell them when he would not sell the higher grades. Such heifer calves from very superior cows can be bought when a few days old for

about $3 each. Do this the second year also; after that you will have calves enough of your own. Feed your calves whole milk, 12 to 14 pounds a day, till they are one week old. Then have it part skimmed milk, till when the calf is four weeks old it may be all skimmed milk, about 16 pounds. Have the milk warm to about blood heat. Have some good hay always within their reach and after they are two weeks old, always have a box that they can reach, with bran and oats in it. Feed them no corn meal. While they are having milk it is better, until they are at least four months old, not to let them run out to fresh grass, but have them in a yard where they can run for exercise, and where there is a cool clean stable where they can go to get out of the hot sun, and away from the flies. It will pay to keep up the milk feed till six months old. When it comes cool weather next fall put them in stanchions nights. Feed them as great a variety of hay and fodder during the winter as possible with 2 or 3 pounds of whole oats and bran, or oats only, each day. I advise putting them in stanchions while so young so as to train or educate them to that mode of confinement, for, when they come to be cows, there is where they will be kept most of the time during the winter season.

Handle your heifers; treat them gently and kindly, and you will have no trouble breaking them to milk.

### Ration for Milch Cows.

I think as good a grain ration as you can get for cows in milk, is one-third bran, one-third ground oats and one-third corn meal, all by weight, about 12 to 14 pounds to each cow daily. Be guided as to the quantity by the appetite of the cow, and her ability to turn her food into milk. The corn is given to maintain the condition of the cow. It is not the best milk producing food; but some heavy milkers have the ability to turn almost any kind of food into milk. Such cows will bear more corn. Give them all the good early-cut clover hay, corn fodder, and straw they will eat, giving as great a variety each day as possible. In the summer, if they have good grass and plenty of it, that will do very well, but I think it will pay even then to feed a small ration of grain.

Now, this is in the direct line of rearing a good herd. By the treatment I have described you will develop and improve your cows. They will, perhaps, produce 50 pounds more of butter each next year, on the same kind of fare, than it is possible to get out of them this year; and the year after next you will get still more. The more milk you manage to make a cow give, the more she can give as you develop her capacity to do so, until a certain limit is reached, and she will in a measure, transmit these improved qualities to her progeny.

### Test Your Cows.

Weigh the milk of each cow separately every day, or at least once a week for the year. Test it frequently to see what per cent. of butter it contains. At the end of the year foot up your figures, average your per cent., and see what each cow has done. If you have any cow that makes less than 150 pounds the first year get rid of her, she pays only for her feed and gives you nothing for your work. With the treatment I have been advising, you ought to get from 200 to 250 pounds the first year, and considerable more the next year.

Have your heifers come in when they are two years old. Use a full blood Jersey sire, the best you can get; one, if possible, that is five or six years old, that has daughters that have become cows, so that you can better judge of his merits. I have advised you to grade up with Jerseys. Some other dairy breed, particularly the

Guernseys, may be just as good. But I believe the Jersey will give as large a return for the food consumed as any other breed, and they being more plenty, you can, no doubt, grade up with them with less trouble and expense. When once you have started with a breed, follow up that line, and don't mix breeds. Above all thing don't try to raise the general purpose cow. I tried hard to get her, and did get her, but she was profitable for no purpose, and that kind of foolishness cost me very dear.

When your heifers come in, weigh and test their milk for a whole year, so that you can tell without any guess work, which produces the most; and when you have any to sell always let the poorest go. Let your standard be solely, the amount of product, and count as nothing such immaterial things as color or particular markings, or fancied beauty of forms or features, for they will not produce butter; and, after all, "handsome is that handsome does."

### Get a Uniform Herd.

If it should happen that the daughters of one particular cow—for instance, the brindle one—should average considerably better than those of the others, she is the cow to tie to, to be the source from which shall, in time spring your whole herd. She may not produce as much as some of your other cows, but she has, no doubt, got good blood back of her that shows in her descendants, all of which you should keep (except some poor ones if there should happen to be any such) and in a few years your whole herd will have some strong resemblance, with their pedigree all tracing back to "Old Brin."

### Results.

And now, my dear friend, if you wish to profit by the experience of others, and will follow substantially the plan I have outlined, I shall expect, if I visit your place a dozen years or so hence, to find that your mortgage has long been paid, and the productiveness of your farm doubled. You will be a happy, contented and prosperous man, with a pleasant family enjoying the comforts of life. The grumbling and complaining disposition you manifested when I saw you at Jefferson will have entirely disappeared. You will have a splendid herd of cows, for which you have the greatest admiration, and in which you take great pride, and in the rearing of which you have taken immense pleasure. "They will produce more than 300 pounds of butter each a year," you will proudly say. You will have a large and convenient barn with a large silo, and a snug little house with pleasant surroundings.

While you have been developing and improving your cows, you have been developing and improving yourself, by the exercise of the thought, study and close attention to business necessary to success.

You will be a more obliging neighbor, a kinder husband and father, and a better Christian in consequence of having exercised the care, patience and kindness necessary to rear a *good dairy herd of cows.*

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### DISCUSSION.

Chas. Brigham—How long would you keep your cows?

Mr. Goodrich—I would keep them as long as they gave me a good profit. I have had them do well until they were 14 or 15 years old. Sometimes I do not keep them until they are 3 years old.

J. M. True—What kind of grain would you give the heifers while developing?

Mr. Goodrich—I would give the feed that would make them grow and come to maturity young, but not put on flesh; I wouldn't feed corn or timothy hay; it

would be clover hay and oats or bran and ensilage.

GEO. WYLIE—What constitutes a good dairy cow?

MR. GOODRICH—One that will make 300 a year.

GEO. WYLIE—Nothing less than that?

MR. GOODRICH—It might be; that ought to be the standard; no man ought to be satisfied with less than that.

GEO. MCKERROW—How is he going to find out whether he has a good dairy cow in his herd?

MR. GOODRICH—By testing her, weighing her milk every other day or occasionally, and keeping a record of it.

THOS. CONVEY—How would you test it?

MR. GOODRICH—Test it by setting the milk by itself. Take a day's milk and stir it into butter. That tells me what I can get out of it. It may may not tell what there is in it, but it tells what I can get out of it.

G. C. HENDIE—Do you discard any of your heifers in your dairy work, and if so, what per cent.?

MR. GOODRICH—I sell off from my herd the increase and they are the poorest cows, that is about 30 per cent. of them go every year.

H. C. THOM—Who buys them?

MR. GOODRICH—Anybody that don't know better.

H. C. THOM—Your neighbors?

MR. GOODRICH—They are sold and shipped to Chicago; the ones that the stock-buyers want are the ones I don't want to keep.

MR. SNOWDEN—Can you get scrub cattle and begin dairying with them successfully?

MR. GOODRICH—I think you can.

WELDON VAN KIRK—How much importance do you attach to exercise in a dairy herd?

MR. GOODRICH—The calf and the heifer ought to have exercise to develop their muscles, but after a cow comes to giving milk I am well satisfied they need but very little exercise. I tried that a year ago last winter. I had one cow that had a notion of milking herself. I kept her in the stanchion. She would be let out before the rest twice a day; she would walk about 60 feet to the tank, and being alone would walk right back and put her head in the stanchion. She wasn't out to exceed 10 or 15 minutes a day.

J. H. WISE—I would like to ask at what age a heifer should drop her first calf?

MR. GOODRICH—I wouldn't want them to have calves before they are 2 years old.

H. C. THOM—What effect would lack of exercise have upon the offsprings?

MR. GOODRICH—That cow had a fine, large heifer calf in the spring. That is the only one I ever kept confined so closely, and she is doing well this spring.

MR. RUNDELL—Which do you prefer to raise, spring or fall calves?

MR. GOODRICH—Fall calves can be raised with less trouble than spring calves.

H. C. THOM—If butter was the same price the year round, would you encourage having calves dropped in the spring or fall?

MR. GOODRICH—There would be very little difference now that I have a silo. I think that if a cow comes in in February, and you have dry feed through the winter, you can get more out of her during the year than you can to have her come in in the fall, but with ensilage I am pretty well satisfied you can get just as much out of a cow coming in in September or October as out of one coming in at any other time.

GEO. WHICHER—Isn't it more trouble to feed her?

MR. GOODRICH—No; it is less work taking the whole year through to have them come in in the fall.

R. B. BROOKS—Do you warm the water for the cows?

MR. GOODRICH—I do.

R. B. BROOKS—Don't you think it is better to turn them out twice a day to drink?

MR. GOODRICH—I shouldn't object to having the water in the barn.

Do you get sunshine in your stable?

MR. GOODRICH—There are plenty of windows that admit sufficient light on sunshiny days.

H. ROBBINS—How soon do you take the calf away from its mother?

MR. GOODRICH—When it is three or four days old.

MR. SNOWDEN—How much of an outlay in cash would I have to make to do successful dairying with a few cows?

MR. GOODRICH—If you wanted to do it as cheaply as you could, it wouldn't be a very large outlay. You need a tank and five or six cans. I think you could fix up for setting your milk at a very small outlay, $15 or $20.

GEO. WHICHER—I would like to know what temperature you mean by warm and cold water for dairy stock. If spring water came out of the ground smoking in winter time, would it be necessary to warm such spring water?

MR. GOODRICH—If I had water at 48 or above the temperature of the earth, and cows would drink it at that temperature, I wouldn't be to the trouble of warming that water.

H. C. THOM—Wouldn't you if the cows had to go 80 rods to get to the spring?

MR. GOODRICH—I wouldn't have them go 80 rods to the spring. Where water is pumped into a tank, unless you have a heater, the cows will have ice water all winter, which isn't best.

MR. DENNIS—Wouldn't it be more profitable for the average farmer to have a good, fair-sized cow that would give a fair amount of milk than to keep a Jersey cow?

MR. GOODRICH.—That comes into the general purpose cow question. I don't believe any individual ever tried harder than I did to get that cow. I couldn't be reconciled to the Jersey. Mr. Curtis here knows it. I thought I had got her once, I will describe the cow. I bought a 2-year-old heifer of the old style roan Durham of the wonderful milk family of that breed. She was a beautiful specimen—at least I thought her so at that time. She had a very large fine udder, and when she got to be four years old she used to give 60 pounds of milk a day when she was fresh. Sometimes she gave more, and that was fairly good milk that would test four pounds to the hundred, so that she made nearly two and one-half pounds of butter per day. When I sold her she brought $75. Now, that is as good a general purpose cow as you can get. She started out with a good quantity of milk, but she didn't hold out with this quantity of milk, but kept running down, and in seven months she was practically dry. I used to strip her for a month longer. Well, by occasionly weighing the milk and testing it, I figured that she produced 256 pounds of butter in a year. You see that is a pretty good cow. That is just the cow you are asking for, but I never made one cent of profit on her except when I took in the $75. Her weight ran from 1,500 to 1,700; when in good condition, towards 1,700 pounds. She was two cows in one in size, and took nearly the feed of two small cows, so you see when you come to take that into consideration, it was small doings.

Now, I will compare her with another cow. I had a cow that weighed just 800 pounds, half her size, and took just half the feed, perhaps a little more. She had the dairy form, and that cow produced 256 pounds, as near as I could figure, the same

as the big cow. The big cow took $25 worth of feed more than the little cow, so I made $25 profit a year on the little cow and milked her 12 years and sold her for $15, though I got $315 from her, and all I ever got from the other was $75. The little cow was worth $240 more to me than the big cow. You see I want to give the general-purpose cow all the advantage I can. I have an 800-pound cow that makes 120 pounds more than this one. She will make 375 pounds at least in a year. That cow with the same way of figuring would make me $500 more than I would make out of the big cow.

R. B. BROOKS—How do you think the two cows compared in regard to the number of pounds of milk? Where I live a man would get as much for 100 pounds from one as from the other.

MR. GOODRICH—The big cow gave some more milk; it was just about average milk. The other cow was not a rich milker; I think it took some 23 or 24 pounds of her milk to make a pound of butter. But the little cow gave milk eleven months in the year and the big cow only seven.

J. H. WISE—Do cows that are fresh in the fall give as much milk in the year as those fresh in the spring?

MR. GOODRICH—I can get as much out of them with ensilage when they come in in the fall as when they come in in the spring.

MR. DENNIS—Do you consider it any more trouble to keep a beef cow with a full flow of milk with plenty of feed than a dairy cow?

MR. GOODRICH—When you undertake to feed her to keep it up, she turns the feed into beef instead of milk. I cannot make a beef cow give as much milk as I can a dairy cow.

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# BUTTER-MAKING ON THE FARM.

By THOMAS CONVEY.

### Conditions of Success.

This depends on circumstances; where a few cows are kept on a large or medium sized farm, where much other work has to be attended to, it hardly pays to manufacture butter for the general market. A small quantity requires almost as much time in manufacturing and marketing, and equally as much attention as a larger quantity, and rarely sells as well, owing to the fact that each package should contain butter of the same quality, with regard to salting, color, degree of freshness, etc., this being more difficult to secure where a package contains different churnings. Buttermaking on the farm, if conducted in a business-like way, will certainly pay as well, at past or present prices as selling milk to cheese factories, at sixty to sixty-five cents per hundred, it being contracted for that price the present season. If skimmilk is worth twenty cents per hundred, and I consider this a low estimate. If hauling milk costs the patron another twenty cents per hundred, and how much less does it cost him where he delivers twice a day? If you allow anything for loss of fertility, occasioned by selling milk off the farm,

and then deduct two per cent. of gross income which goes to factory owners, this being the custom in southwestern Wisconsin, and you will have some difficulty in convincing the maker of good butter of the advantages of selling milk and feeding whey.

### Quality Before Quantity.

The gathered cream butter factory, is scarcely more popular, where the proprietor determines the amount and quality of cream, and the price he will pay, the latter depending on the price he receives. This, in turn depending on the quality and quantity of food given each cow, and the cleanliness, care, and intelligence of each and every patron, creamgatherers and buttermakers. In the separator factories they run less risk of producing an inferior quality of butter. The patron does the hauling, and this system, though the least objectionable of the factory systems, will hardly become popular until milk is paid for according to quality not quantity; this being also an objection to the cheese factory. Milk should be set as soon as possible in cold water, in preference to cold air, and in ice water, in preference to cold spring, or well water. Yet good butter can be made from cream secured in any of the ways mentioned, provided the air or water has no objectionable odors. The temperature should not be below 40° nor should it run above the normal temperature of spring or well water. When set in cold air it should be at a lower temperature than when set in water, the latter being the best conductor. The more rapid the cooling after being set, the more perfect the creaming. Delay in setting milk always results in loss. Aeration of milk will improve its keeping qualities, but retards creaming and should never be resorted to in buttermaking.

If the temperature should fall much below the normal heat, when obtained from the cow, warm water may be added not to exceed 6 to 8 per cent. at a temperature not to exceed 125°.

### Skim the Milk Sweet.

I prefer to skim cream when sweet, and if held it should be at a low temperature, to prevent ripening. In warm weather it is safer to put it in water where milk is kept, churn as soon as possible as it gains nothing by age. When you wish to ripen it, keep it in an atmosphere of about 60°, when it should ripen in about twelve hours. In winter time where held at a low temperature, it will be necessary to raise the temperature of cream to 60° or even slightly above that before trying to ripen. It may take twenty-four hours to ripen in winter time. I prefer to churn when cream is slightly sour raising the temperature to 64° before starting to churn in cold weather. In raising the temperature be careful not to over-heat any portion of cream. Do not pour warm water in it, but place vessel containing cream in warm water, and stir vigorously to secure uniformity of temperature. This being essential to uniformity of ripening, the latter being necessary to secure the greatest degree of churnability.

### General Directions.

Cream prepared in this way should churn in thirty to forty minutes. When butter comes in small grains, stop churning, allow it to stand a few minutes that butter may rise to the top, draw off buttermilk. Should butter come with the buttermilk, you have not churned enough, or your cream was over-ripe

and too thick, in the latter case add weak brine or water, when buttermilk is drawn off, wash butter three times, using weak brine the first time and sufficient water each time to float butter. The last washing should be nearly clear, taking care to keep the butter in granular condition until buttermilk is washed out and salt incorporated, working just sufficient to secure an even distribution of salt or the color would not be uniform. If you wish to salt in the churn use 1½ to 2 oz. of salt to each pound of butter, leaving sufficient moisture in the butter to dissolve the salt, and allowing it to stand about one-half hour expressing surplus moisture when packing. I prefere to weigh butter and salt at least one ounce to the pound, salting and working on the butter worker and packing immediately. Good butter contains 10 to 12 per cent. of water, but it should show no trace of buttermilk. Avoid overworking, or any plastering motions in working butter, or finishing packing as they destroy the grain and keeping qualities and give the butter a greasy appearance. Butter color is a commercial necessity at least during a portion of the year. It should be added to the cream first before starting to churn.

**Butter Granules.**

The grain of butter may be destroyed by over-heating, or freezing, milk, cream or butter. They are not similarly affected by the same temperature. The flavor may be injured by milk, cream, or butter being kept where it would come in contact with odors from cooking, smoking, decaying vegetables, bad water, etc.

**Aroma.**

The flavor may also be affected by the quality of the food, grass in June producing a desirable flavor, but additional feed may be given at any time as it improves the flavor, increases the quantity of the product and improves the keeping qualities. As butter from dry feed melts at a higher temperature, mixed foods produce better flavor than any single food, and rich foods produce the best flavors if they are of desired quality. Immature grass is injurious to body and flavor, weeds, cabbage, etc., will give objectionable flavors. Use best grades of dairy salt, and do not store where they will take up odor of kerosene, fish, etc. If churn or butter worker is inclined to get mouldy as they sometimes do in damp warm weather, clean thoroughly and rub on dry salt.

**Packages.**

In preparing packages I prefer to throw in salt and then scald, cover up and the steam will make it pickle-tight. Use cold water to rinse and rub inside with dry salt. Never put poor butter in fancy packages, and when you can make good butter you may very safely brand it, there is no necessity of putting your name on it, but be sure you do not brand inferior goods, then it can be sold like a popular brand of baking powder, on its merits. In finishing top of package use dairy cloth on top of butter, then make a paste of dairy salt and put it over cloth. It will prevent top of butter from getting over-heated and will also guard against flavor of lid. Remember that good butter must have perfect grain, high, fresh flavor, desirable color and a sufficient amount of best quality of salt. That it must be put up in clean, bright, packages of best quality and of a style the market demands.

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DISCUSSION.

L. H. ADAMS—What is the objection, Mr. Convey, to a lower temperature than 40 degrees in which the milk is set?

MR. CONVEY—Because the milk con-

denses down to that temperature and after that it expands; condensation of course increases weight, and an increase in weight increases the comparative difference between the butter fat and the milk serum.

C. I. BRIGHAM—I should like to ask if cream will likely get sour standing only twelve hours?

MR. CONVEY—In summer it will; in winter twenty-four hours.

SUPT. MORRISON—Can a pound of finished butter be made to retain any more than a half ounce of salt?

MR. CONVEY—I think not; chemists state that that is the case and I believe it to be so.

SUPT. MORRISON—Is the other half ounce, if it is undissolved, of any benefit to the butter?

MR. CONVEY—I think not, except that the stronger it tastes of the salt the harder it is to detect decay in the butter.

C. P. GOODRICH—Why do you put in one ounce?

MR. CONVEY—Because the market demands that.

C. P. GOODRICH—Does it retain that?

MR. CONVEY—By having dissolved salt in it, it will.

MR. GOODRICH—Does the market demand that?

MR. CONVEY—Sometimes it does; I have had more fault found with my butter on that account than anything else.

C. P. GOODRICH—Isn't it a fact that the saturating brine makes the butter salt, and the more you work the butter the less salt it will have in it?

MR. CONVEY—That is so.

C. P. GOODRICH—Doesn't a portion of that ounce run out in the brine in working the butter?

MR. CONVEY—Of course it is impossible for an ordinary dairyman to determine how much salt is retained, but in selling butter I find that there is more demand for more than an ounce than for less than an ounce.

GOV. HOARD—Of all the qualities in butter which do you estimate as the most important in securing a good price?

MR. CONVEY—Flavor.

GOV. HOARD—I think you are right. Now, how long can you retain the first fine flavor that stamps the value of butter?

MR. CONVEY—I would put the limit at two weeks, and possibly less than that time. I have always found long keeping a failure.

QUESTION—Why set milk in ice water if you have cold spring or well water?

MR. CONVEY—The colder the water, not getting below 40°, the more rapid the creaming and the more thorough the creaming, and the quicker you can skim.

QUESTION—I have a spring that registers 46°; would you prefer ice water to that?

MR. CONVEY—Not as far as the butter is concerned.

L. H. ADAMS—What is the butter flavor, where does it come from?

MR. CONVEY—It comes from feed I think, breeding having very little to do with it; that is you can't produce a fine flavored butter on poor feed. I think it rests entirely in the feed and the manner of handling.

WELDON VAN KIRK—I heard a gentleman say the other day that a person is liable to injure the flavor of the butter by breaking the grain in working. I would like to have Mr. Convey's opinion about that?

MR. CONVEY—It would certainly destroy the keeping qualities.

WELDON VAN KIRK—Would it injure the flavor at the time?

MR. CONVEY—I think over-working or over-washing will destroy the flavor.

C. P. GOODRICH—Will the milk from two cows kept on the same feed be of the same quality?

MR. CONVEY—I think if the cows are healthy that it will; it will be just alike with regard to flavor.

C. P. GOODRICH—That is not my experience. What is your opinion, Gov. Hoard?

GOV. HOARD—I think there is an individual difference there.

C. R. BEACH—I don't want to tell but one story. I was in Chicago sometime ago and asked the steward of the Palmer house, who had been buying the butter from a celebrated herd of Jerseys, what kind of butter he got. Pretty good, he said. But he says, no such butter as you used to send to the West Side Briggs house when I boarded there; how did you make it? I said, We made it down in a dirt cellar, out of the milk of common cows, fed on marsh hay, with my swill barrel at one end of the milk rack and a soap barrel at the other. Well, he said, it was good butter anyway. What gave the quality to that butter? The cows were farrow cows being fed with Indian meal to make beef of them. The quality of the feed does make the quality of the butter, and the cow that is not with calf will make a great deal better flavored butter than a cow that is with calf.

GOV. HOARD—After a cow has got six months along in gestation, doesn't the flavor leave the butter?

C. R. BEACH—Certainly; if it has anything like the flavor of the butter of a new milch cow or farrow cow.

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# TEMPERATURE IN BUTTER-MAKING.

By D. W. CURTIS, Secretary of Wisconsin Dairyman Association.

### Setting Milk Warm.

The whole process of good butter-making is governed almost entirely by temperature, from the time the milk is drawn from the cow until the cream is ripened and churned into butter.

The milk when first drawn from the cow if immediately placed in cans and submerged in water standing at 45° to 50° all of the cream is thrown up between milkings. If allowed to stand around until partially cold and then placed in water at 55° to 60°, the loss is at least from 5 to 10 per cent. The importance of setting milk, while warm, in water cold enough to throw up the cream, is of a sufficient value to warrant any one, who is in the habit of doing this work when they have time, in making the test. The temperature of the milk, together with the temperature of the water in which it is placed, has very much to do with the profits of the cow.

### Care Will Give Success.

It has been an inquiry of many why separators are taking the place of gathered cream. The answer is one of tem-

perature. The farming community, where the cream is gathered, are careless and shiftless in many cases in taking care of the milk. The farmers do not realize that the poor care given to it, comes out of their own profits. If the milk stands around for half an hour before being placed in cans, and the wind, and the boys, do not feel like pumping fresh water into the tank, it is all the same; the farmer never once thinking that he is only beating the creamery man out of the quality and himself out of the quantity. If this same milk had been brought to a creamery where the separator is used, it must be brought to a temperature of 70° to 75°, according to the season of the year; the butter maker is careful that his separator runs at the right speed, and the milk is just at the right temperature to insure the best results. If the same care should be exercised in caring for the milk on the farm, and the temperature looked after as closely as the butter maker is obliged to look after it, to get the best results, the two systems would vary but little. In fact, there are gathered cream creameries that use the submerged system of setting milk that are paying dividends quite as large as any creameries in the country. The success of both methods is one largely of temperature, for should this be neglected the results would be largely against them.

#### Flavor Depends Upon Temperature.

In the ripening of cream temperature plays almost as important a part as it does in the creaming of milk. In open vats, cream ripens best at 60° or 62°. If it is below that, the chemical action takes place very slowly; if much above that degree, it imparts anything but a pleasant flavor to the butter.

The generally accepted theory of ripening cream is that it must be frequently stirred and come in contact with the oxygen of the air to develop the aroma so much sought after in good butter. Cream which is allowed to ripen in all degrees of temperature bring different degrees of acidity, and consequently the butter is affected by it. If the acidity in cream could be ascertained the same as the temperature, by the use of the thermometer, I venture the assertion that there is not one butter maker in a hundred that could tell the acidity within ten degrees.

#### Boyd's Starter.

The Boyd process of ripening cream is directly the reverse of all this, and is wholly controlled by temperature. Sweet skim milk (from fresh cows preferred) is taken and warmed up to a certain degree and placed in a can with non-conducting walls so that it shall not be affected by heat or cold, where it is allowed to remain from 18 to 24 hours. It is then ready for use. This produces a perfect lactic fermentation. The cream is sweet, and is placed in a vat or can with non-conducting walls, so as not to be affected by the surrounding temperature. It is heated up to 68° or 70° and 1 or 2 per cent. of the lactic ferment added and thoroughly mixed in. The vat is immediately closed air-tight and left there from 18 to 24 hours. This lactic ferment which has been added commences to work through the entire mass of cream, and imparts to it the same principle, and producing the chemical change necessary preparatory to churning. It is far better to supply the cream with the right kind of ferment, that shall produce uniformity in quality, than to have the cream seek its own agent for ripening, containing

many of the destructive elements which go to destroy fine butter.

### Temperature Means Profit.

Tempering cream for churning must be governed very largely by the cream that is to be churned, and this knowledge must be gained by the butter-maker who is doing the work. The rule laid down in books, that 58° to 62° is the right temperature to churn at, will not hold good in all cases. A prominent creameryman once said: "I test my butter-milk with Short's test, and if I find any butter-fat remaining, I change the temperature of the cream—and keep on changing the temperature until the right degree is found that leaves the least butter-fat in the butter-milk." This knowledge must be gained where the work is done, as the cream from different creameries and dairies will churn best at different temperatures.

Mistakes are often made in getting the temperature of cream, both in warming up and cooling down, from the fact that the serum or watery part is affected by heat and cold very quickly, while on the contrary the globules or fat in the cream are not so sensitive to the different degrees of temperature. As the butter globules have time to absorb the heat or cold, it is not infrequent that the temperature is changed from 5° to 8°. Should it rise that much and the butter come soft, it is charged to friction in churning." Cream may be cooled very rapidly to the required temperature, yet the butter will be soft, which clearly indicates that the butter globules were not sufficiently cooled before the churning commenced.

### General Rules.

The process of butter making may be governed very largely by a few genera rules: obtain a good themometer and use it; note the temperature that gives the best results; let cleanliness and temperature be the controlling factors. See that the milk as soon as drawn from the cow is placed in cans and summerged in cold water. Skim the cream sweet, and keep it so by placing the can in cold water, until ready for ripening. Warm it to the right temperature and furnish it with a ferment that shall give it the right degree of acidity in a given length of time, or let the cream furnish its own agent for ripening, and *guess* at the proper acidity. Determine by experiment at different seasons of the year the temperature in churning that shall give you granular butter and leave the least trace of butter fat in the butter-milk. Wash all traces of buttermilk from the butter, work it lightly at a temperature of from 58 to 62 degrees.

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### DISCUSSION.

JAMES SPENSLEY—What do you mean by ripening?

MR. CURTIS—I mean getting it of the right acidity; getting it just right to churn.

JAMES SPENSLEY—Is it necessary that the cream should be sour to churn?

MR. CURTIS — No, sir; I suppose you can churn sweet cream as well as sour, if you so desire.

JAMES SPENSLEY—Would it have as good a result?

MR. CURTIS—I don't suppose so.

JAMES SPENSLEY—Would the butter be as good.

MR. CURTIS—That is a question that doctors disagree on; the theory is nowadays that we have all got to make sweet cream butter; that is the latest fad in butter-making.

L. H. ADAMS—That raises one more question. If feed makes the flavor in butter, why are we objecting to sweet

cream butter, as some of us do and some do not. Why do those who object to it lay it to the cream being churned sweet, if, as they claim, the flavor all comes from feeding.

GOV. HOARD—You have the same butter with just one difference—the acidity.

C. R. BEACH—You will admit that there is a flavor in a rose leaf, will you not? but you will not get one-half of it until it is bruised.

GOV. HOARD—The acidity you think brings it out?

C. R. BEACH—Souring.

JAMES SPENSLEY—Would you recommend churning sweet cream at the same temperature as you would sour?

MR. CURTIS—I do not recommend churning sweet cream.

JAMES SPENSLEY—There is lots of cream churned sweet. Now would you churn it at the same temperature?

MR. CURTIS—No, I suppose not.

SUPT. MORRISON—What would the temperature be?

MR. CURTIS—Anywhere along in the fifties—fifty to fifty-five degrees. I know nothing about it excepting what I have read; I have never churned any. I believe down in Virginia, where they have been making sweet cream butter for the President, they churn the cream at 55 degrees.

GOV. HOARD—That is English butter.

THOS. CONVEY—What ferment do you use and how would you produce it?

MR. CURTIS—I told you in the paper I would produce it from sweet skimmed milk; I would heat it up to 90° in a water bath and would allow it to stand from 18 to 24 hours; it then becomes lobbered milk. Take off the top of this and add one or two per cent. to the cream which has already been heated to 75°; shut the vat up tight. This ferment wants to be mixed through the cream, the same as yeast works through bread, and it gives the cream a nice, pleasant acidity, and when it is so treated, 18 to 24 hours will produce the cream ready for churning, and will also do so every day in the year. But when you ripen in open vats or open cans I claim there is no man, not even a professional, can tell within 10° or 20° what the acidity of the cream is. They get very close to it sometimes. Here are Mr. Goodrich and Mr. Beach, they get their cream very nice, because they are careful of the temperature of their rooms and keep it pretty near the same all the time. But generally people who ripen cream in that way can't get within a row of apple trees of the proper acidity for churning. Sometimes it is too sour and sometimes not sour enough.

C. I. BRIGHAM—What proportion of the ferment do you use?

MR. CURTIS—From one to two per cent.; if I had a hundred gallons of cream I would use from one to two gallons of ferment.

SUPT. MORRISON — We are very fortunate to-day in having with us Mr. C. R. Beach, of Whitewater, who supplied the Sherman House in Chicago for many years, and who is called one of the best butter-makers in the state; and also Mr. Goodrich; and we have here a couple of pages of formulated questions that will bring out a great many interesting suggestions and also a great deal of experimental work and I would like to have Mr. Beach take the paper and read the questions and give his answers to them. It will help us to make up a good *Bulletin* and you will receive a great many suggestions in this line.

C. R. BEACH—"Please give a statement of your dairy, how many cows, how many pounds of butter sold, and what

it brought?" I have never kept a dairy of cows continuously for a year. We make butter largely in the winter and milk many more cows in the winter than we do in the summer. For the last three winters we have been milking about thirty to thirty-five during the winter. I think last year the sale amounted to about 9,000 pounds, which would be an average of about 300 pounds to the cow. The average price last year was 28 cents and this year ending January, 1890, it was 21 cents.

"What does it cost to keep cows?" That question I will skip because it would be mere matter of inference.

"What is the ration?" We vary it somewhat. This winter we have fed twenty-five pounds of ensilage, 12 or 15 pounds of shock corn, and a little oats mixed, eight pounds of bran, and probably five or six pounds of hay. Our usual feed is about forty pounds of ensilage made from Yankee corn, ten pounds of bran and what hay they will eat at night; we don't feed hay but once a day.

"Do you feed the mill stuff wet or dry?" Dry.

"Do you run a winter da iry?" Yes.

"How many pounds of milk for a pound of butter?" Last winter it would take about eighteen; this winter we are so situated that we have a different class of cows (somewhat) and it takes about twenty; day before yesterday I think it took just an even twenty, five pounds to the hundred.

"Do you groom your cows?" We do not.

"Do you summer feed with grain and what is its influence upon butter?" We always summer feed cows when giving milk; we think it not only improves the flavor of the butter but gives it solidity; butter made upon a grass feed alone has not quite the consistency that it has with other feed. In damp or rainy weather we occasionally give twice a week a feed of dry hay.

"How many pounds of butter do you make per cow for a year?" I answered that before as nearly as I can.

"How long do you keep cream before churning in summer; also in the winter?" We churn every day in the summer. The milk is always sour with us when skimmed. In the summer when we churn every day there will be two skimmings; morning and night and churning the next morning. In the winter we churn every other day and have four skimmings.

"Do you wash your butter in the granular form?" We do.

"Do you add salt to wash water?" Yes, always. Sometimes instead of putting it into the water we throw salt right into the churn before adding the water.

Gov. HOARD—Why do you add the salt?

C. R. BEACH—Well, because the high-toned dairymen say it is best. It tends to lower the temperature and brine is heavier and floats the butter better. I see the man from Oregon recommends the putting of salt into sweet cream. I sometimes put in a handful of salt in the cream when I put it into the churn.

"Would you advise coloring butter?" I certainly would, because the market demands a high colored butter.

"How many times do you work the butter and how?" We work it but once. We wash it; salt it in the churn; revolve it a few times; put it upon a butter worker and press the moisture out slightly and put it in the tub; it is in the tub in less than half an hour after it

comes and it is not disturbed after that.

"How do you keep your stables free from odor?" Only by ventilation. We have not used land plaster and I therefore cannot speak anything about that.

"Do you allow your help to misuse cows?" Not if I know; I presume they sometimes do.

"What temperature do you keep your stables?" I cannot answer that question definitely; we keep about forty head in a stable seventy by thirty, and we ventilate the place, and such weather as this we keep the windows open. I think fifty degrees is warm enough and some of the time it does not reach that. It never freezes in the stable so as to stiffen manure at all; we try to keep them comfortable.

"At what age do you have your cows come in?" I buy my cows in milk generally.

"How long do you milk your cows before letting them go dry?" Too long altogether. I think every cow ought to go dry two months every year. I often milk my cows until I am sorry I have milked them so long. I think ten months is long enough.

"How much more stock can you keep on your farm than you did before you commenced dairying?" I cannot answer that question but I differ from many as to the opinion that simple dairying improves the farm. You cannot retain the fertility of your farm if you stock it full of cows and send the milk to the factory and do not feed a grain ration.

"What sort of grasses do you prefer, mixed or straight?" I prefer mixed grass and for cows for pasture I prefer grass that has never been disturbed; I think it is better and richer in butter fats, gives a better flavor and holds it longer.

"Do you have any difficulty in drying up your cows?" None at all. Tie them to a post for a week and they will dry up all right. A man asked me for a receipt to dry up a cow and I told him that.

"Have you ever had any difficulty with abortion in your herd?" I have had a great many cases of that.

"Is it contagious?" I don't know.

"Did it continue in winter?" It did.

"How much corn would you feed a cow giving milk?" Five or six or seven pounds would be the extent that I would ever feed it. If I couldn't have but one feed I would make it wheat bran without the corn.

"Is a ton of bran worth as much to feed as a ton of oats?" Perhaps not, but a dollar's worth of bran ordinarily is worth more.

"Would you thresh oats or feed them in the straw?" "Would you run them through a feed cutter?" I would feed them in the straw and run through a feed cutter every time.

"What is the best kind of hay to feed cows?" If I was feeding corn and cornstalks I would prefer clover; June grass hay I think is fully equal to it.

QUESTION—Did you ever use millet?

C. R. BEACH—I never did.

"Is well cured corn fodder with the ears on and run through a cutter as good feed as corn ensilage?" It is not. If a man has not got a silo I would certainly recommend running this corn through a feed cutter, but it lacks softness; it is not as thoroughly digested, more corn passes the cow, it is more work to prepare it and is not as desirable.

"How many pounds of butter should a cow make a year in order to make her profitable to her owner?" That would depend on how much the butter sold for and how much you fed the cow. You

cannot fix any particular number of pounds; the more pounds of butter she gives the better she pays. How low a point you may go and still make a profit you should not find out; you should find out how many pounds she can make.

"Is any special breed necessary to secure a good butter cow?" We have breeds of cows in which a large percentage of them are better butter cows than others; there are good cows in all breeds and good cows in mixed breeds; but if I were going to take my chances I would take grade Jerseys or full bloods.

"Do you test your cows?" Occasionally.

"How?" By churning each cow's cream separately.

"What variation do you find?" More than I want to.

"Can you change the quality of the milk by the feed?"

That is what I claim you can do. I claim that by feeding you can not only produce in her the habit of giving richer milk. You can't take her to-day and have the quality change tomorrow a great deal. I met a man some time ago who said to me, why do you have such great faith in feeding bran; I fed my cows half a ton in three days and I didn't see any great change. But you can, by continuous feeding, produce in cows not only the habit of giving milk, but can increase the richness of the milk simply by giving your cows good treatment under favorable conditions and surroundings. Corn when fed to excess will decreae the milk. The effect of corn upon milk is to render the fats solid or hard; to a certain extent that is desirable, but an exclusive corn feed is not desirable, and if a cow is inclined to fat rather than to giving milk she takes on fat at the expense of quality of milk; the effect of too much corn ration is that it renders the milk too tallowy.

GOV. HOARD—I want to ask if it is not somewhat liable, if you feed a cow too heavy a corn ration, to change her from a milking habit to a beefing habit, particularly a young heifer.

C. R. BEACH—I think so, and I think a cow at any time when from any cause she has begun to put on fat and shows a laying on of beef, you cannot very well stop it; she has been wrongly treated in some way.

"How is it with oats?" There is nothing better for butter or milk than oats, but the objection is it usually costs too much.

"How is bran for butter fats?" Bran is one of the best and cheapest rations, and if mixed with corn or oats it is almost invaluable; we wouldn't know what to do with it.

GOV. HOARD—Have you ever tried barley?

MR. BEACH—Some years ago I did, but some way I had the impression that the butter was drier and crumblier, that it had neither the solidity nor the richness of corn, nor the soft flexibility of bran. (These are all matters of opinion and not authority.) Bran gives a flexibility in winter which is very desirable; it is very much superior to corn. With hay and corn and oats, you make very rich and very solid and very high flavored butter—it is most delicious.

C. P. GOODRICH—Will the milk from cows having bran exclusively for their grain ration be richer in butter fats than it is where it is half corn?

MR. BEACH—I can't tell you, sir.

C. P. GOODRICH—I understand that it is not, but people generally think it is better where they are fed corn.

MR. BEACH—Those of us who are mak-

ing butter for the profit aim to have winter dairies, and there is one advantage in this the cow is not so far gone in calf, and the flavor of the butter is not injured by her being in that condition, we get therefore a better flavored butter from her grain feed, than we would if she came in in the spring.

Gov. Hoard—The butter of a cow far along with calf is not worth as much in the market either.

Mr. Beach—No, sir. We know that it does not take half as much trouble to take care of cows in the winter as in the summer. We can afford to crowd them pretty strong in the winter.

"What effect has ensilage upon the quality of milk?" My friend Goodrich is a new convert, and he says it makes it better. I have been feeding it three years and I do not think it makes it any worse.

Gov. Hoard—A gentleman back of me inquires if you have ever fed rye.

Mr. Beach—I have never fed rye.

Mr. Whicher—It is miserable feed for cows.

"Do you feed roots?" I do not.

"Do you find any difference when you change from roots to ensilage?" I can't answer that.

I have found that there is one thing about ensilage, that the butter comes quicker than it does on dry feed; it comes quicker than June butter. We can churn out the butter fat from the cream and get a larger percentage from ensilage. When we can get 15 or 20 tons of corn ensilage to the acre that we know is good we don't want to dally with turnips. I know that ensilage is good and can be cheaply produced and will give a large amount of feed. Do you know that an acre of ensilage will more than furnish a cow rations for 365 days of the year and have enough left to pay for the bran she will eat.

Gov. Hoard—That is more than keeping a cow to the acre.

Mr. Beach—I merely say that it will give more than 365 days' rations and leave enough to buy the bran for her.

"If you desired to enrich your land rapidly, what ration would supply the most fertility?" Wheat bran.

Supt. Morrison—And clover hay.

Mr. Beach—Yes, clover hay, but wheat bran anyhow, and feed wheat bran in the summer for pasture. You will give back more fertility than you take from it. You may pasture a field indefinitely; feeding wheat bran rations and they will grow better all the time.

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# MY DAIRY EXPERIENCE.

By JAMES McPHERSON.

**A Farm Dairy.**

My experience dates from about the year of 1874, when I began keeping cows on a small scale, sending my milk to a cheese factory. This paid fairly well for awhile but, with high prices for making and low prices for the cheese, I concluded I could do better than patronize the cheese factory, so built a milk-house, bought a Cooley creamer and commenced making butter and shipping it to Chicago. I thought I was doing pretty well, and did make some money at it as the butter sold at very good prices.

About this time I read a report of some noted dairyman's herd, which had made overs 300 pounds of butter per cow in a year's time. I think this was in 1880. I got out my cash book and went to figuring.

### Must Do Better.

I learned that, after allowing the cows credit for 365 pounds of butter used in the family, they had only produced 156 pounds per cow for the year. I thought this too great a difference to be true. I thought the 300 pounds to the cow man had stretched the truth into a pretty big yarn to advertise his Jerseys. At this time I had in my herd a half-blood Jersey cow, five years old. I thought she was a pretty good cow, although I had several others that would give a larger mess when fresh. I tested this cow about April 1st, 1880. The food she was having at the time was bran and tame hay, and from seven milkings we churned seven pounds of butter. This was an eye-opener to me, and from that time I have used Jersey sires in my herd. I found that beef cows were not the most profitable kind for butter-making.

### Tries a Creamery.

Three and a half years ago I commenced taking my milk to the Fort Atkinson creamery, and from March following to the next first of March I received in cash a little over $63.00 per head, receiving my skim-milk back. The average price the butter sold for was within a small fraction of 25 cents per pound, deducting 4 cents for making, it netted me 21 cents Three hundred pounds of butter at 21 cents per pound amounts to just $63.00. For fear that you may think as I did about the 300 pound-yarn, I will say that I have no Jerseys that are for sale. In my herd there were ten two-year-olds and ten three-years-olds, heifers which I figured in as fifteen mature cows. While I do not give the whole credit for this increase in butter per cow, yet I believe a large part of it is due to the infusion of Jersey blood in my herd. I feed better than I used to, and my cows are all fresh in the fall of the year — two conditions which cannot fail to increase production.

### No Use Kicking Against the Silo.

One year ago while in attendance at a Wisconsin Dairymen's meeting at Augusta, I sat on the anxious seat on the silo question, but before the meeting adjourned I was fully converted and determined to build me a silo. Well, I built one and now the only fault I have to find with it is, it is not half big enough. I think a dairyman wants about 12,000 pounds of ensilage per cow for the year, so as to bridge over any shortness of pasture or hay crop that may occur in a dry season.

# HOW HAVE OUR GREAT DAIRY COWS BEEN BRED?

By T. L. HACKER.

Most farmers think that the phenomenal butter cows are accidents, not knowing or thinking that, as a rule, they inherit their butter capacity; some think it the immediate feeding and manipulation of the owner; others—don't *think* at all—and these last discredit the large butter tests; still others there are, intelligent breeders, who shrug their shoulders and wisely shake their heads and don't believe a word of it—presumably, because they have not the material, or having it, have not the patience or faculty to make the most of it.

To doubt the authenticity of most of our butter tests, corroborated and vouched for, as they are, by men of unquestioned integrity, men who in social and business circles stand in the foremost ranks, and whose word, no one would dare to question on any other subject, is utterly ridiculous, and as presuming as it would be for me to say, I do not believe the Holstein cows give the quantity of milk their owners claim—or to say, I doubt the statement of my neighbor, who says his Swigert will take him to town and back in two hours, because it takes my Percherons all day to make the same distance.

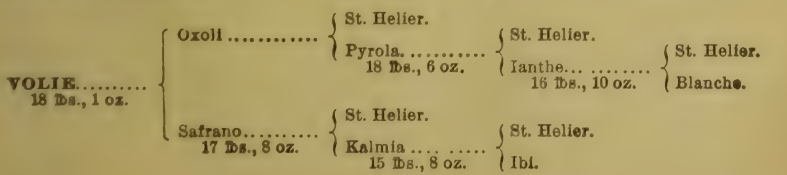
It is not but fair to assume that these records are true, and so, studying the pedigrees of some of these famous cows, we may find from whence and how their great butter heredity comes.

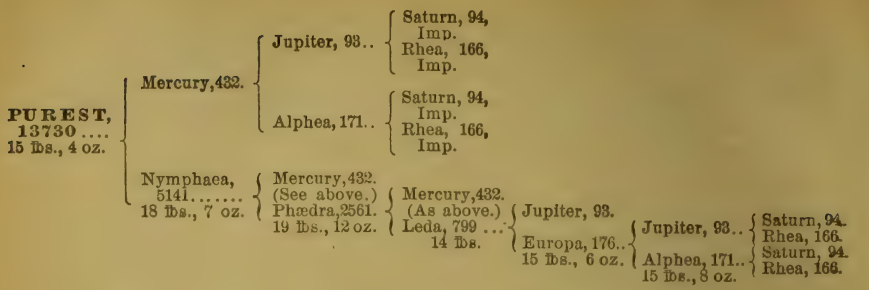
As a building to endure great strain or pressure, must be "builded upon a rock," so, must constitution and butter heredity be the foundation of the great dairy cow; this being secured we must next look to the lines of breeding, intensifying the nature by inbreeding, yet, not carrying it so far as to result in constitutional weakness or passivity, although there is very little danger, if the foundation animals are strong and vigorous, as will be seen by the breeding of the cows Volie, and Purest.

**Specimens of Close Breeding.**

St. Helier-45-was bred on the island of Jersey and was the result of forty years' inbreeding in unbroken family lines—he was imported, and was bred to cows, in the manner indicated by this pedigree of Volie.

St. Helier and Blanche produced Ianthe, 16 lbs. 10 oz.; St. Helier and Ianthe, Pyrola, 18 lbs. 6 oz.; St. Helier and Pyrola, Oxole; St. Helier and Ibi, Kalmia, 15 lbs. 8 oz.; St. Helier and Kalmia, Safrano, 17 lbs. 8 oz.; Oxole and






Safrano, Volie, 18 lbs. 1 oz. There are thirty odd cows similarly bred and with similar results, a number of them several more removes with St. Helier as sire, with even greater results, and all showing good constitution.

In Purest, of the Alphea family, we have a little different form of inbreeding which has been carried to a degree seldom ventured on by breeders, and which has been, so far, very successful.

Saturn and Rhea imported from Jersey produced Alphea, 15 lbs. 8 oz., and also Jupiter, who was bred to his full sister Alphea and produced Europa, 15 lbs. 6 oz.; Europa bred to her sire Jupiter, produced Leda, 14 lbs. Jupiter and Alphea again produced Mercury; Mercury and Leda, Phaedra, 19 lbs. 12 oz.; Mercury and Phaedra, Nymphae, 18 lbs. 7 oz.; Mercury and Nymphae, Purest, 15 lbs. 4 oz., as a two-year old.

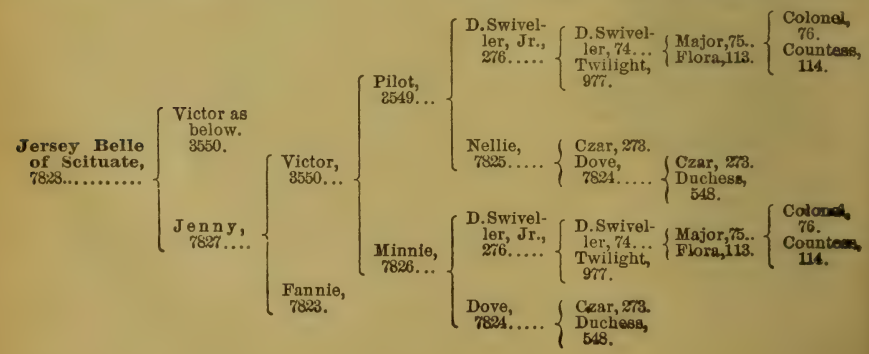
Every female in this pedigree since importation has made a butter record, and Mercury has twenty more daughters testing over 14 lbs.

These animals had good, strong constitutions and transmit their good qualities to their progeny.

These two examples are sufficient to demonstrate the fact that the closest inbreeding can be practiced without producing constitutional weakness or diminishing the ability to make a large butter yield.

### Jersey Belle of Scituate.

In the year 1850, the old Massachusetts Society for the improvement of domestic animals, sent Mr. Thomas Motley to the Island of Jersey to purchase the best dairy animals he could find. He brought over the bull Colonel, said to be out of the best cow on the Island, and the cows Countess, 16 lbs. on grass only; Flora, 511 lbs. inside of a



year; Twilight, Jenny and Duchess, three excellent dairy animals. They were bred together until the blood of all these animals was united four times, culminating in this great cow that yielded, when six years old, 705 lbs. of butter in a year on light feed; the largest ration of grain fed to her during the winter of her year's test was only two quarts of bran daily. Two years later she made in one week 25 lbs., with a ration of two quarts each of cornmeal and bran.

She had a perfect dairy form, full, placid, intelligent eyes, a clean, thoroughbred appearance, thin, long neck, sharp withers, capacious body, high rump, thin incurving thighs, an enormous udder, measuring when fresh, five feet three inches, perfect teats and a navel remarkable for its development—she is considered the most perfect model of a dairy cow.

What a grand opportunity to establish a family of almost perfect dairy animals by breeding Jersey Belle to her own kin, was lost by the foolish prejudice against inbreeding, so that her wonderful butter heredity was dissipated and in a large measure, lost.

The dairy interest is to be congratulated that breeders are now more enlightened and their efforts more directed to holding together good blood lines, intensifying and strengthening the good results already attained.

It is still a mooted question, whether close breeding can be carried on indefinitely without constitutional deterioration; this is being thoroughly and intelligently tested by William Simpson, of New York, and thus far his experiments have been remarkably successful, as shown by the heifer Purest, whose pedigree you have seen.

Eurotas, whose yearly butter record exceeded that of Jersey Belle, is our next example.

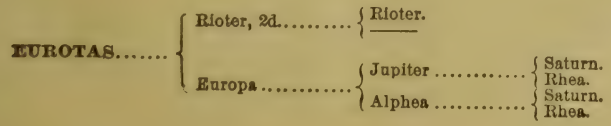
The dam of Eurotas was the inbred Alphea cow, Europa, the product of full brother and sister. Eurotas was bred by R. M. Hoe, of New York, who, possibly doubtful of the wisdom of further inbreeding, sent to England for the young bull Rioter 2d, sired by Philip Dauncey's Rioter; he was bred to Europa and produced the great Eurotas that made 778 pounds of butter and dropped a strong, healthy calf within a year.

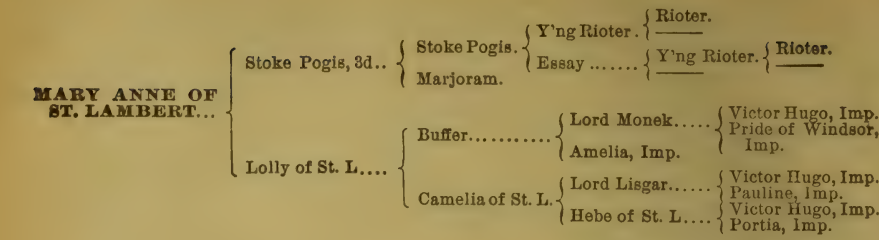
This cow inherited her butter qualities from both sire and dam.

**A Great Jersey Breeder.**

Mr. Dauncey was unquestionably the most successful Jersey breeder of his day. Judging from results he was a master hand at the business, for nearly half a century he bred for large butter yield, strong constitution and solid colors, and here let me say, during all that time he went only once outside of his herd for a sire, and only retained him until he secured a bull calf out of the desired cow, to take his place, which shows that outcrossing was no part of his plan. So firmly did he fix these desired points in his stock that breeders at the present time, resort to his strains to secure these most desirable points.

This is a marked illustration of the






great benefit conferred upon all interested in dairying, by the skillful breeder, who devotes his time and ability to establish certain characteristics he may have in view.

**Selection the Basis of Success.**

We may learn much by a close study of the pedigrees of his noted animals; it is evident from these, that he had no special formula, but combined those animals which would intensify and strengthen the points desired, regardless of kinship.

**St. Lambert Family.**

We will next examine the breeding of Mary Anne of St. Lambert, whose weekly and yearly record exceeded that of Eurotas, being 36 pounds in a week, and 867 for the year.

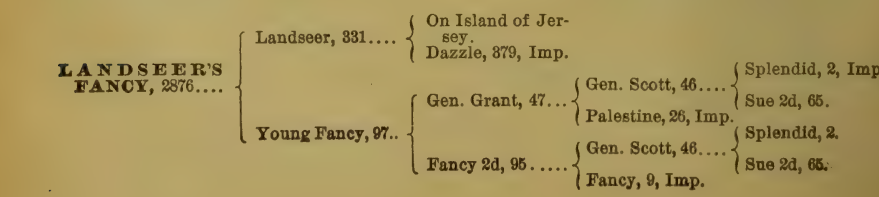
I have carried out the pedigree of Stoke Pogis 3d, to the third remove, to show that the sires of these two cows are descendants of Dauncey's Rioter, Eurotas being a grand-daughter, and the grand-sire of Mary Anne being an inbred grand-son of the same Rioter.

Lolly of St. Lambert, the dam of Mary Anne, traces three times to Victor Hugo, who has demonstrated that he was one of the most potent butter sires in the Jersey breed. He was bred on the Island of Jersey, and imported in 1868, by S. S. Stephens, who used him for a number of years and subsequently he became the property of a gentleman in Kenosha. Victor Hugo was as remarkable for his high spirit, as for the superiority of his descendants in the dairy, which are noted for their excellent fore udders and strong constitution, and these peculiarities are as strongly developed in the Rioter or Stoke Pogis family, being almost abnormally developed in the great St. Lambert cows.

There are about thirty cows similar in breeding to Mary Anne, averaging 20 pounds per week.

We will now take the queen of the dairy, Landseer's Fancy, a cow that has given the largest authentic yearly butter test.

The test began January 26, 1885, when past twelve years, and was finished January 26, 1886, making 111 pounds, 15½ ounces in thirty days, 206 pounds, 9 ounces in sixty days, 302 pounds, 15 ounces in ninety days and 936 pounds, 14¾ ounces in a year. She dropped a healthy calf June 29, 1885, about the



middle of the test, and was again bred Sept. 29, 1885, so she carried a calf during nine months of the year's test. Her usual feed was four quarts of corn hearts and two quarts of bran.

### Quality of Milk.

The ratio of milk to butter was 5 7-11 pounds of milk to one of butter; 2⅝ quarts of milk made a pound of butter.

The dam of Landseer's Fancy was inbred to Splendid 2d, whose daughters were not generally tested except for quality of milk, some of them producing a pound of butter from less than four quarts of milk, when fed the ordinary rations of that day. Splendid was doubtless the richest bull ever imported, and his quality is fully demonstrated in Landseer's Fancy, and many other noted cows.

Imported Dazzel and Fancy, were noted for remarkable richness, so this queen of cows was produced by a union of animals whose strongest characteristic was *quality* not quantity, which was intensified in her, and, her performance as a butter producer, considering the small quantity of milk given by her, has astonished the dairy world and provoked no end of comment as to its correctness.

For the week ending July 22 the milk weighed 152½ pounds which made 29½ pounds of butter, a fraction over 5 pounds of milk to a pound of butter.

This is one of the most striking results of intelligent effort in breeding for a specific purpose, what wonderful cows may be obtained by uniting animals having the same qualities in a superlative degree. When we see how freely the animal kingdom responds to the will of man it seems as if nothing was impossible of accomplishment to him who persistently and intelligently works for it.

### DISCUSSION.

THOS. CONVEY—I would like to ask Mr. Hacker if the best cows there have not had the largest number of outcrosses?

MR. HACKER—I remarked before that we have no knowledge of the breeding of those two animals.

GEO. MCKERROW—Hasn't inbreeding reduced the size of the Jersey?

MR. HACKER—The Jersey is a small cow, that is a fact; but I am not satisfied that the cause lies in inbreeding for this reason, there are two islands side by side in the British Channel; the Guernsey has been as much inbred as the Jersey and yet she is a large cow; I think she will average the size of our native cows, if not larger. I am of the opinion that the small size of the Jersey is occasioned more by precocious fecundity or early maturity. As a rule she drops a calf when she is two years old, and from that time she neglects herself and throws nearly all that she consumes into the udder.

GEO. MCKERROW—Landseer's Fancy and Eurotas are better cows than their dams and grand-dams; now why are they better? Is it not from the fact of the outcross?

MR. HACKER—Judging from results they are better, but I am hardly prepared to attribute it to the outcross. That might be the case. I have a theory about that and I will give it to you. I believe that inbreeding intensifies the nature; I believe that it devolops the nervous temperament, and I am of the opinion that it makes the animal more delicate.

GEO. WYLIE—Isn't it pretty generally conceded that, outside of breeding Jerseys, the tendency of breeding in and in is to weaken the constitution, and that the tendency is towards disease and barrenness in animals bred in that way?

MR. HACKER—I could only answer that outside of the Jerseys from reading.

GEO. WYLIE—Isn't it so with the Jerseys?

MR. HACKER—No, sir, inbreeding does not produce barrenness. We have nothing to indicate it at all. This idea that inbreeding causes barrenness is caused by the inbreeding of Shorthorns. But they have a different temperament and inbreeding will not produce the same results on them. A rule that will apply to Shorthorns and beef animals or to a hog will not apply to a dairy animal.

W. H. COLE—In raising dairy animals what feed do you think best calculated to develop their dairy qualities, and do you think it a disadvantage to give them milk after three or four months old?

MR. HACKER—I have fed mostly ground oats to young animals. I never allow them to lay on flesh, for it has been my experience that allowing a heifer to do so, ruins her for a first-class dairy or breeding cow. So far as feeding milk is concerned, I think it better to feed milk until five or six months old.

H. C. THOM—Do you ever feed dairy calves whole oats.

MR. HACKER—I generally do feed whole oats; they are better.

C. I. BRIGHAM—Is there any danger of pampering a cow? Danger of taking too good care of them and causing them to loose their ruggedness?

MR. HACKER—My experience is that a cow should be pampered from the time she comes in until she dies.

GEO. WYLIE—Would you advise farmers to inbreed in the manner that you have mentioned?

MR. HACKER—I would not. Not to that extent.

R. B. BROOKS—What is the effect of breeding from immature sires?

MR. HACKER—Immature sires will not as certainly transmit their good qualities as mature sires.

GEO. WYLIE—Why would you not have farmers inbreed?

MR. HACKER—Because it is not likely that they will read an animal as thoroughly as a breeder will; they will not see the defects and consequently it will not be as safe.

GEO. WYLIE—It wouldn't be safe to tell a farmer that he could not see the defects of an animal as well as you can

MR. HACKER—I thought I knew somethink about Jerseys a great many years before I did know anything about the subject.

JOHN MARCH—Should a cow be fed grain before calving? Oats for instance.

MR. HACKER—From the time that a cow is dried off I would feed her lightly on non-carbonaceous feed, until about a week before time and from that time I would give, in addition to her regular feed, a little ration of oil meal.

WELDON VAN KIRK—How long should a dairy cow go dry?

MR. HACKER—That depends altogether on the dairy cow. There are some dairy cows that it will injure to go dry at all, but as a rule a Jersey cow will do better by having four weeks' rest than she will if milked throughout the season.

# EVENING SESSION.

## IS IT NECESSARILY HARD TIMES FOR GOOD FARMERS?

By C. R. BEACH, Whitewater.

**Do We Receive Fair Returns.**

"The fault, dear Brutus, is not in our stars, but in ourselves, that we are underlings!"

I shall not, in the short time allotted me, attempt anything like a full and philosophical discussion of this question, but shall confine myself to a very limited inquiry as to whether the farmers of Wisconsin get a just proportion of the world's wealth they are helping to create, or in other words, are we as farmers receiving fair returns for capital invested and labor performed and if not why not? And whose fault is it?

This is a question of facts and not theory.

**A False View.**

There are those who claim to believe that the farmers are a much abused class—that all the rest of the world have conspired together to rob them of their hard-earned dollars—that virtually they are the slaves of capital.

That the banks, the railroads, the manufacturers, the merchants and the middle men, are taking the lion's share of the accumulations of labor, leaving to the farmer only a bare pittance to supply his most pressing wants, and to pay taxes.

That the government both state and national, legislate mainly in the interest of large capitalists—that the interests of the farmers are almost entirely ignored, save that now and then a few crumbs are thrown to them, to save or to win votes.

If all this and much more that is preached were true, and I believed it, I would quit farming and engage in some other occupation; for I should carry about with me a feeling of degradation, a want of self-respect, did I belong to a class that was not in every sense the peers of any other class. No man can do his best in any business in which he thinks the odds are against him.

But it is not true.

**Pleasant Homes, Fine Farms and Good Stock.**

Go where you will throughout the state, you will find hundreds and thousands of men the owners and cultivators of highly improved farms, equipped with all the modern appliances of improved farming. Stocked with good cattle, housed in spacious and comfortable barns, the farmers themselves living in almost palatial homes, furnished with soft carpets, elegant furniture, well filled libraries, music to charm the ear and paintings to please the eye and delight the fancy.

They drive fine horses, and ride in fine carriages and wear good clothes.

Should you ask them how they came by *all* this wealth, and they will almost to a man tell you that they came to this state poor, and all that you see about them is the honest product of legitimate farming; that aside from what you see about them, they have raised and educated children, helped the boys to money to start in business, given marriage portions to the girls, helped to build roads, school-houses, churches and public buildings, contributed to the support of religion and the countless benevolent objects whose aim is to make the world better.

**No Depression in Good Farming.**

A business that has enabled these men to accomplish such results in spite of governmental disfavor, of legalized frauds, of crushing monopolies and unholy combinations in the form of trusts, must of itself be good business. You may go into any city or village in the state with from two to five thousand inhabitants, say Platteville if you please, can fifteen or twenty of the business men in that place buy out an equal number of the best farms in the surrounding county? I think not.

Do you hear of one farmer failing where you here of ten merchants or manufacturers making assignments? Do you know of a single instance where a temperate and industrious man who has run in debt for a farm? I care not, if it be for the whole purchase money, that has had it sold from under him unless from unforeseen misfortune? I have lived in the state for more than thirty years and I have never known such an instance.

**Walworth County.**

As a further illustration of the favorable pecuniary condition of the farmers of Wisconsin allow me to refer to Walworth county, where I reside. This county has a population in round numbers of 28,000. The assessed valuation of the whole property of the county in 1888 was $15,552,005, if this assessment was made upon the basis of 60 cents on a dollar the real value of the property would be $25,920,000 or $925 for every man, woman, and child in the county.

But there are 19,000 residing on farms to 9,000 residing in cities and villages, and figuring upon the same basis, the property of these 19,000 on farms is equal to $1,025 to each individual as against $716 for each of the remaining 9,000 who live in cities and villages.

The farmers of Walworth county certainly have their share of the wealth that has been accumulated. As compared with their neighbors, their property may have been assessed relatively higher, but it was not assessed for more than it was worth. Only last week I took dinner with a farmer past middle life and I asked him this question that has been given me to answer:

Is it necessarily hard times for good farmers?

His reply was, it may be a little close for some, but not more so than for men in other branches of business.

**Farming Does Pay.**

Farming, said he, is the surest and best business in the world, and if I was to live my life over again I would be a farmer. This man commenced for himself with nothing and by running in debt for land. Fourteen years ago he was the owner of a farm that sold for $12,000. While looking for a more desirable location, he made a few successful speculative ventures on a board of trade, the result was that before he stopped, he lost all that he was worth save a few hundred dollars. But without whining,

he and a grown-up son, for the next five years worked other peoples' land on shares, for the last seven years they have worked lands for which they have been in debt for a large share of the purchase money. Today they could sell and be worth $12,000 to $15,000, all the fruit of farming. Has not farming been good business for them?

**Result of German Economy.**

Across the fields from my home lives a German who some dozen years ago was working by the month. He married and worked his employer's farm for seven or eight years. Two years ago he bought the farm where he now resides for $8,000, and had money to pay half down and own his tools, teams and stock enough for the farm, and in a very few years will own the farm clear, which with the working capital will be worth $10,000.

I might multiply such instances by the hundreds but time will not permit.

**Good Farming Pays.**

But what per cent. do farms in Wisconsin pay on their "selling value?" There are so few farmers that keep a debit and credit account with their farms that it is somewhat difficult to obtain sufficient data to answer only with approximate certainity.

But it is much larger than is generally claimed, and fully equal to the average of business ventures. I have inquired of several men, some of whom rent farms on shares, and others that receive money rent, and they will range from 4 to 7 and 8 per cent.

But the object of this paper is not to so much determine the rental value of good farms, but rather what returns may reasonably be expected from lands well managed by the owners.

For I pray God the time may never come when any considerable part of Wisconsin soil shall be owned by others than those who cultivate it.

At a farmers' meeting held at La Crosse last month this question was discussed at some length. A Mr. Harris thought that a majority of good farmers were making 7 per cent. on their investment. Mr. Hanchett said he could make his farm pay 10 to 12 per cent. Henry Richmond kept a set of books and knows just what his farm has paid, and said that it was more than 6 per cent. and that he had bank checks to show for the money.

Not far from me lives a man who owns and works a farm of 120 acres of about an average of farms in fertility.

While he makes the production of milk a leading business he can hardly be called a specialist. His cows are of no particular breed and while they are well-kept they are not crowded. He raises some calves to keep his dairy good, raises one or more colts each year, sells some grain and now and then a beef.

I have his statement of his farming for 1889; this statement, though not very minute, is sufficiently so to get at approximate results:

| | | |
|---|---|---|
| **INCOME.** | | |
| Milk from 22 cows taken to factory | | $852 68 |
| Calves sold | | 22 00 |
| Hogs | | 190 00 |
| Cows sold, whose place is supplied by heifers | | 187 00 |
| Thirty bushels of wheat | | 24 00 |
| One hundred bushels of potatoes | | 25 00 |
| One three-year-old colt | | 165 00 |
| Beef | | 30 00 |
| One old horse | | 45 00 |
| | | $1,590 68 |
| **DEBT.** | | |
| Hired help | | $125 00 |
| Use of tools, fence repairs, blacksmithing | | 100 00 |
| Taxes | | 50 00 |
| Bran purchased | | 200 00 |
| Capital in farm at $60 per acre, 7,200 | | |
| Stock and tools 2,800 | $10,000 at 7 per ct. | 700 00 |
| | | $1,175 00 |
| Balance | | $415 68 |
| Use of home, fuel, provisions raised on farm for a family of six persons, use of horse for boy and girl attending high school | | 400 00 |
| | | $815 68 |

This $815.68 will more than pay the owner and his wife for their work and that of his son who helped milk and made himself generally useful. I have not given this statement because there is anything remarkable about it, but rather because there *is not*. This man has done no better than very many are doing, and no better than any of us could do. If there are common farmers with ordinary methods who can realize 7 per cent. on land valued at $60 per acre, it is certainly fairly good business.

**The Necessity of Keeping Farm Accounts.**

The trouble with the most of us is that we do not know anything about what our farms do pay. And even if we do make estimates there are many items that we fail to credit to the farm that properly and justly belong to it.

Let us suppose a man with a family of six persons, wanting a home, purchases a farm of one hundred acres of land, within three miles of a railroad town at $70 per acre, with good buildings, the use of the house for a home would be worth $150, fuel from the farm $50, the milk, the butter, the pork, the eggs and the poultry, together with the vegetables for use in the family $150, use of horses aside from necessary work on farm, $50, making $400. Almost six per cent. on the whole investment. But you will say, they form no part of an income. True, but they would form a very important part of one's out-goes if they had to be paid for.

**The Farm a Good Investment.**

Money in a farm at 5 per cent. is as well invested as money loaned at 7 per cent., for one does not need to be looking for new places to invest, and then there is always a reasonable prospect that land well located will advance in price. It is better than railroad stock. Mr. Blackstone, president of the Chicago & Alton railroad is my authority for saying that of 650 railroads companies in the United States, only 83 paid dividends to stockholders in 1888. Of these only nine paid 10 per cent., seven, 8 per cent., fourteen, 7 per cent., twenty-four, 6 per cent., and the remaining nineteen paid from 1 to 4 per cent.

That the entire railway stock in the country paid only 62-100 of one per cent. in 1888 with an increase of traffic of more than 14 per cent., the divisible profits were reduced 12½ per cent.

**Real Estate Better Than Railroad Stock.**

Of sixty-two railroads in Illinois forty-nine paid no dividends and thirty-six did not receive money to pay expenses. You will say that much of this stock was watered but it is not to be presumed that there was six parts water to one of value. The railroad commissioner of Nebraska says that the railroads of that state could be duplicated for $16,000 per mile but admits that on that valuation they have not earned seven per cent. I think then that I may safely say that capital in farming pays as well as railroad stock. And so with capital in manufacturing though it may pay ten per cent. or twenty per cent. on the *investment*, if for any cause the article manufatured ceases to be in *demand* or the price reduced by *successful competition* the profits may entirely disappear and the stock become worthless. A bank's stock may pay twelve per cent., but the security of the investment rests solely on the sagacity and integrity of those who manage it. I have a friend that owned stock in an eastern bank that was worth 130 cents on a dollar, but in two years the stock was worthless and the stockhold-

ers were assessed 100 cents on a dollar to pay losses.

The reason that a farmer can not hope to make a million dollars out of his business, is because it can not be carried on profitably only within narrow limits; within that limit it may pay a better per cent. than a business that yields a million dollars of revenue.

### The Secret of Large Gains.

Phil Armour in his statement before the United States senate committee in reference to the pressed beef trusts, claimed that his average profits on 340,649 head of cattle stamped and sold in the pressed beef trade in 1888 was only $1.22 per head, a sum less than Hiram Smith realized on a single tub of butter, or Theo. Louis on a hundred-pound pig —yet he made a half a million of dollars. The real danger from great combinations of capital is not that they will increase the cost of production, but rather that from economical combinations, of money, machinery and labor on large scales, competition in a small way will be destroyed, and so large numbers who would otherwise be independent producers, masters of their own business, must either seek new fields of labor, or become the hired employes, and so the servants of great monopolists. The Standard oil trust, the greatest monopoly in the country, makes oil cheaper rather than dearer.

### Cause of Low Prices.

But to come back to our subject. While it may be generally admitted that farming in the past has been fairly remunerative there is a wide-spread feeling that the present low prices of farm products is but the natural results of causes that have long been at work and are still working, and that there are more reasons to expect lower prices rather than higher. That by the rapid extension of railroads and steam navigation the ends of the world are brought together that space has been almost annihilated.

That the invention and almost universal use of the self-binder and steam thresher, together with numberless appliances for increasing the production of food materials with lessened labor, together with opening up of vast areas of new territory of virgin soil and unsurpassed fertility, on the continent in Australia and in Asia has resulted in an over-supply of the markets of the world with wheat, and to some extent with meat, and the prices are, and will continue so low, that in all the older countries they can be produced only at a loss.

### The American Farmer not Alone.

That farming in Great Britain has become unprofitable, that during the last twenty years the shrinkage of value in England and Wales alone of farming lands and capital used in cultivating them will amount to $5,000,000,000. That the price of farming lands in New England, and New York have depreciated nearly one-half, and that even here in Wisconsin many of our farm products go begging for a market at prices below their cost of production.

### Business Methods and Cheaper Production.

To all this and much more than can be said in this line I will only answer that the tendency in all departments of human industry is towards cheaper production, and that the farmer must keep step in the changing order of things or get left. Is there any reason why we as farmers should be able to buy a self-binder, a lumber wagon, a covered carriage, a shovel, a pitchfork or a hoe, a pound of sugar, a yard of factory cloth for half the price of twenty years ago

without a corresponding reduction in the price of what we have to sell?

What is the object of a department of agriculture, of experimental stations, of appropriations for scientific investigation as to economical methods of producing crops, of feeding tests to determine how to get the best results from a given amount of feed?

Of appropriations for farmers' institute if all these are only to result in putting more money into the farmers' pockets and not at the same time lessen the cost of food to the consumers?

**Old Ways, Poor Crops—Unprofitable Cows Must Go.**

But can the Wisconsin farmers at present prices get pay for his labor and fair interest on his capital invested? That depends upon how he farms, and in what shape he sells his products. If he follows old ways and manages so as to raise only poor crops sells hay, straw, corn, oats and barley, lean cattle and hogs, ill-bred horses and poor butter, I answer, no.

But if he farms intelligently so as to make every acre produce a fairly good crop and feeds it on the farm without waste in such a way that it goes to market as a finished product of the highest quality, I unhesitatingly answer, yes.

It may be that Wisconsin can not compete in wheat growing with the Northwest, and it is fortunate that she can *not*, or with the Southwest in raising cattle; but in products that require intelligence and skill, the odds will be in her favor. In the production of butter and cheese we can hold our own as against the world.

I have shown you a case where an ordinary patron of a cheese factory realized more than 7 per cent. on sixty dollars per acre, even at last year's prices—but on farms well adapted to grass and corn, with good butter cows *winter* dairying—and a silo—a return of 10 per cent. on $100 per acre, would not be extraordinary, provided the requisite amount of skill and intelligence was applied. Such dairymen are not complaining of hard times.

**Profitable Industries.**

A *twin* industry in connection with dairying is the making of pork. An acre of clover pasture in connection with dairy slops and wheat shorts, supplemented with corn and fed to well-bred hogs, even though sold at $3.50 per hundred, will pay more than the interest on a hundred dollars per acre, provided always that the requisite amount of skill be employed. With our clover, corn and dairies, we can beat an exclusive corn country in making cheap pork.

No state in the Union is superior to Wisconsin for raising good horses. It is not an unusual occurrence for a well-bred, good sired draft colt to sell for $150 to $200; in *raising* such *colts* there is *always profit*, and so with good driving horses—but more than half of *us* who raise such horses, still continue to raise those that have to be sold for less than a hundred dollars if *sold* at *all*.

The raising of mutton sheep and early lambs for market, when intelligently pursued, can be made to give profitable returns.

Dairying, pork making, horse raising, mutton and lambs for market, summer feeding, steers with grain on pasture—any and all of these can be made to give large and sure returns.

The conditions are that we make our products of the very best quality. That we study our business and then put the best that is in us, into it; fail we so

many of us—I might say *all* of us, in so many ways, in doing as well as we know that the wonder is not that our farms pay so poorly but that they pay so well.

**Yield, an Important Factor.**

Do any of you realize how far we come short of making our farms produce what they might? Only last season in the state of South Carolina on a poor worn-out *soil*, an acre of land was made to produce 255 bushels of shelled corn, and 24 tons of fodder.

A woman in New York raised a crop of potatoes that yielded at the rate of 1,061 bushel per acre. I do not say that we ought to beat these records, but they show how far we come short of knowing the possibilities of production. How much we lose in failing to save in the the best possible manner what our farms have produced. How much we lose in failing to feed in such combinations, and in such a way and at such times as will give the best results. And more than all, how the best of us could double our profits if every animal on the farm was of the higher type of its kind.

**More Thinking and Less Muscle.**

If we have failed in any particular it is not because we have not worked enough, but rather because we have worked too much, and thought too little. In the past, muscle has been the prime factor in production. In the future it must be skill, clear thinking, and wise planning, if the scales are to indicate a balance on the side of profit, and they will if we do the right kind of thinking. We cheat ourselves in so many ways it is no wonder that we think everybody is cheating us.

The way to reform the world is to reform ourselves. The way to make the world respect and honor us is for us to respect and honor our calling—making it what it should be, the most useful, the most honorable and the most profitable in the whole range of human activities.

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# FOOD ADULTERATION.

BY H. C. THOM, Dairy and Food Commissioner.

**Cheaper Food.**

Unconsciously the nation has drifted into a partial recognition of fraud by a tacit permission to certain manufacturers to conduct a business not strictly in accord with honest principles. Manufacturers and merchants are not alone at fault in this matter of compounding food stuffs so that the original is degraded and cheapened. A cry has come from the people for cheaper food, not fully understanding that the demand could not control the cost price. As is usual in these matters the demand was dictated and urged by the apparent and alleged need rather than by mature judgment.

**Fraud! Fraud!**

The inherent honesty of our people when besieged by popular voice and assailed by the clamor of thousands often wavers and sometimes falls. The result is that the table of the banker, like the table of the wage worker, is burdened

with fraud which represents the cunning of the serpent in the garden, and the seething compound in the witches' kettle. Nothing seems beyond the inventive genius of the imitator. The russet color is blazoned upon the yellow orange. Briny drops and butter texture and flavor appear in oleomargarine to the utter consternation of the honest herdsman and the patient cow. New Orleans molasses springs as readily from corn as from cane. Jellies are as readily expressed in December, in the back room of a canning establishment, as from the red cheeked plum in July. Meal passes for pepper, turnips for horse radish, chicory for coffee, red pepper for ginger, plaster Paris for cream tartar, and alum for baking powder. Beer glass washings ferment to cider vinegar quicker than from the penciled Tallman Sweet. Even smoked halibut is sliced from the ham of a dead sturgeon. Need the list be continued? We are a patient and long-suffering people. Are we not becoming a race of short lived people as well? Is it strange that wails rise to Heaven from the dentist's chair, and that the fires go out in the engines of our bodies, and that our stomachs put on their night-caps and fall asleep to wake in a land where the necromancer is unknown?

### Our Resources.

Wisconsin is a broad and fertile state capable of producing more than enough to keep in comfort her two million people. To our native born have been added representatives of all earth's nations, contributing to our prosperity with their industry, frugality and intelligence. Our people have made homes of comfort and elegance. Wisconsin legislation has equipped health departments with license and authority. Millions are annually expended in sewerage and drainage. Health inspectors are tirelessly tramping through garbage alleys and miasmatic districts. Contagion is fought with science. Midnight processions glide silently by the homes where disease has found no foothold. Glandered horses are shot and burned to ashes. Pest houses are a public necessity. Every township, every village, every city, have watchmen to guard the health of their people. At any cost this must be done. Every house has a family physician. Every one is living a life of sacrifice that his general health may be better. This man denies himself coffee, that man shakes his head with a sigh at the proffered cigar, and another swears off on his morning dram. Why, every morning we say, "How are you?" meaning, what is the condition of your health. What is this thing we guard so jealously, that we are so anxious about, that we spend wealth so lavishly for? It is life. Aye, health is life. With loss of health comes loss of temper, with loss of temper comes loss of content. Feeble brains and an infirm body make a good match, and go halting round the track of life together.

### Adulteration.

Despite all the precautions taken, modern civilization is threatened by an insidious foe which enters every home; a foe born of the greed of gain, a foe whose name is a household word, so common, that, like the tick of the old clock, we heed it never. We are all its victims. Its name is Food Adulteration.

Until recently no protection has been given society against the use of a great number of substances, furnished by unscrupulous dealers, although investigation has shown them to be pernicious to general health. I quote Dr. Beckwith of the Ohio Board of Health: "The use of alum, for instance, in bread making is a

common practice in this country and Europe. We will admit that no symptom of poison is evident from a single small dose of alum, but it is a well known fact among medical men and scientists, that in large doses it acts as an irritant poison, and that it has, in numerous well authenticated cases, produced death.

### Health and Safety.

"It remains for this enterprising age to raise the subject to a destructive science. In the matter of teas, coffees, spices, syrups, sugars and other articles in daily use, short crops or sweeping changes in import duties do not trouble the consumer in the least. The beneficent manipulators of these goods take the import and bring the supply up to the demand in their own ware-houses." Laws are very stringent upon this subject in Europe, particularly in France and Germany. America, which has but recently passed laws regarding the matter, has been in a good position to catch the spurious goods from the old world which they could not sell at home. My friends, we refused to take tea from a foreign port once upon a time; are we not as independent now as then?

Wisconsin contrary to her usual custom did not lead the van to reform in stamping the fraud of adulteration as amenable to the criminal code. New York, New Jersey, Ohio, Minnesota, Iowa and other states have taken great strides in this direction. New York instituted 265 cases last year and collected nearly $9,000 in fines. Thirty-five per cent. of milk tested in the state of Minnesota in 1887, was below grade. Only 2½ per cent. of milk tested in the same districts in 1889 was below grade. In 1888 sales of foreign cheese in Minneapolis was 727,000 pounds; state cheese, 582,000 pounds. In 1889—sales, foreign cheese, 394,000 pounds; state cheese, 1,456,000 pounds.

### Let Us Have Pure Goods.

This radical change was brought about by enforcement of the law relating to the handling of pure goods. It is the aim of every state to protect the interests of her people. Four or five million pounds of oleomargarine are used annually in Wisconsin. This means the product of 30,000 cows. It means that 6,000 farms are deprived of profit and fertility that would naturally come from 30,000 cows. It means that 30,000 heifers remain unborn or are killed at birth. It means over a million dollars handled by manufacturers outside the state instead of farmers within our state who help bear the burden of taxation. No man can live in a business sense and place his butter in competition with tallow and cotton seed oil, so manipulated that it requires an expert chemist to detect the difference between the compound and dairy butter. It is not clear that we should prohibit the manufacture of any mixture that is not injurious to health, but we should strip oleomargarine of its power and that can only be done by obliging manufacturers to make it look like itself and not like butter. Butter has worked all these years to make for itself a market and a demand. Now that they are established it should not be robbed by an imitation. The attack has but just begun. No corner of the state is too remote for its presence. No table so humble, no dining room so grand, no lumber camp so rough, that oleomargarine, with its mellow name, will not walk upon and into, with a deceitful bow and brazen smile, with the claim that its name is butter.

**Our Dairy Resources.**

600,000 cows, patient and gentle, graze upon Wisconsin pastures. $18,000,000 are invested in them by Wisconsin herdsmen. Are we to allow a Chicago corporation to drive our flocks from the fields and force men into business they are not fitted to by birth or training? It is not justice. It is against all ideas of right. The day is near at hand when public sentiment will demand recognition. No man or company of men have the right to stand in the light of a great and common interest. Shall the people and the legislature of Wisconsin show themselves more friendly to a Chicago fraud than they are to a Wisconsin industry? The legislature of 1889 said "No." The honest consumer says "No." We need more perfect laws on this question and I believe the sentiment of the state will be found solidly in favor of their enactment. The bone and sinew which has made Wisconsin a peer among her sister states will crush fraudulent interests to earth. When we consider that the welfare, the contentment and the prosperity of our nation depend upon the health and profitable industry of its people, these benefactions should be protected by decisive action and energetic discipline.

**Adulteration—Poison.**

Half the babies die before they reach the age of three years. Many undoubtedly are hurried to their tiny graves by adulterated milk. Righteous indignation should put a man in stocks who would dole out a thin excuse for milk to the puny child whose mother is too ill and weak to supply it proper nourishment. The greed of gain warps men's souls. A day of judgment is close at hand, and a righteous Father will hold them to strict account and demand full measure. The little band of men who first conceived the Dairy and Food Commission saw clearly the finger board which marked the road along which unscrupulous gain was hurrying men. A halt was called. The momentum of the crowd is great. We had looked too long at the hustling procession with sleepy eyes. No man heeded the cry, but the voice is imperative and must be obeyed. The department is simply one of enforcement. The state has no use for laws that are not administered.

**An Honest Business Usurped.**

A business that has displaced 25 per cent. of legitimate production requires time to check. No state department can reach its utmost efficiency without the hearty co-operation of its citizens. I appeal to every honest merchant, every honest manufacturer, every economist, every honest farmer to join in the lists against the usurper of honest profits and the destroyer of human life.

To most of us it matters little whether death ensues from a large dose of poison, or from the cumulative effects of many small doses. To the philosopher the former is greatly to be preferred.

Wisconsin produces 50 million pounds of butter at 16 cents per pound, which is $8,000,000. Wisconsin produces 40 million pounds of cheese at 8 cents per pound, which is $3,200,000. The product of butter and cheese sells for $11,200,000. Eleven million two hundred thousand dollars of the farmers' money is trembling before the onset of fraud. One-eighth of the total butter product is displaced by oleomargarine to-day, and the fight has but just begun.

**Results of Dishonesty.**

Two weeks since a circular came to my hands in which the name of Wisconsin was held up in shame before the whole

world because she put into the markets of the world fraud cheese. The Consul of America in England writes Secretary Blaine that Liverpool docks are covered with spurious cheese from Ohio, Illinois, and Wisconsin. Committees were appointed to investigate and I was obliged to write the chairman that a few men, and I was obliged to add, some of them farmers, were willing that the fair name of Wisconsin should be trailed through the mire of dishonesty and infamy for the sake of a few paltry dollars. To them—a few hundred dollars—to the state, the loss of millions, and the gain of a tarnished name. Busy Chicago commission men were seen the other day scraping "Wisconsin" from the cheese boxes so that the word would not spoil a sale. Men who bring this about are unworthy the name of men. Honest men stand ready to cheer Wisconsin to the echo. In my judgment they stand ready to throttle a fraud that threatens to lessen their loyalty.

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# A FEW PLAIN THOUGHTS ON THE PRESENT AGRICULTURAL DEPRESSION.

By Gov. W. D. HOARD.

LADIES AND GENTLEMEN:—The world is full of doctors and whenever there appears a patient the aforesaid doctors have any number of diagnoses to offer for the cause of the disease and prescriptions for its cure. Agriculture is at present in a somewhat depressed condition. The profits of it have been lessened. You have listened this evening to a very clean-cut and philosophical essay from one of the most practical farmers and best thinkers in Wisconsin, Mr. Charles R. Beach, who gives you from his standpoint as an intelligent farmer, some good thinking upon this matter. No matter what may be the conditions that attend men and their effort, all solution of difficulty must first come from the standpoint of thought. Human thought is like a calcium light directed upon the facts to disclose their proportions, their relations and our relations thereto. Common sense must be the great solvent of all our difficulties. What is common sense? It is the widest understanding possible of the relation of common things and our relation, if you please, thereto. We are surrounded by a complete environment of common things. As a consequence the best wisdom that we can get and the most of it concerning the laws that govern these things will be very much to our own profit.

A great many people in this country are looking up into the air for the solution of every difficulty. They are praying to a god in the distance and never to the Maker who is close by them. That is in a certain sense as true today of the agricultural mind as it is of everything else. I notice that a thousand farmers are directing their eyes to Washington for relief from agricultural depression, where one is looking to his own effort and his own understanding for that solution.

**Misdirected Effort.**

Now it has struck me that there is a reversion of intelligence in this matter, and I have a few facts to offer you. I have but little faith in legislation taking hold of agriculture and effecting much if any relief; I believe that what ails the farmer is what ails me in my business, which is partially that of agriculture, relating to the manufacture of agricultural products, and that is this: that if I do not obey the laws of success, if my efforts are misdirected, I must pay for it and there is no hope for me in any legislation or in any effort of my neighbor. Therefore the question of *misdirected effort* is a pertinent one to Wisconsin agriculture today. Are we engaged in misdirected. effort, are we wasting our resources, are we earning to waste and not to save? This will be the scope of what I have to say.

Armour & Co. lay down one class of beef in Cleveland for five and one-half cents a pound, by the carcass, and another class or grade at eleven cents. Yet ten of the first grade are produced to one of the latter. Can congress pass any law that will make five cent beef sell for eleven cents? If the law cannot change this state of affairs, who but the farmer must change it?

**Over-Production of Inferior Products.**

In 1880 we had 35,000,000 of cattle; in 1889 we had 57,000,000; our population has increased 13 per cent. but our beef cattle have increased 62 per cent., if these figures are correct. But the increase is largely in the inferior grades where there is no profit in production. Who makes these unprofitable cattle but the farmer? Will any state or national law change him over to a good farmer?

**Millions Lost.**

In Wisconsin we produce about 50,000,000 pounds of butter; 10,000,000 pounds sold last year as near as can be estimated for an average of about 23 cents a pound; 40,000,000 sold for an average of about 13 cents a pound. Do you know of any earthly power but the farmer himself that can change this poor 13 cent butter to 23 cent butter?

**Competing Against the World.**

We have shipped as high as 226,000,000 bushels of wheat to England in wheat and flour in one year. Now we exporting 100,000,000 bushels. England took and now takes, all of our surplus wheat. Russia within ten years has reached an English export of 118,000,000 bushels. India last year supplied England with 54,000,000 bushels. Mark how small a thing has worked a great result. A decrease of 78 per cent. in the cost of jute bagging has made the India export possible. India ships all of her wheat in bags, and a decrease in the cost of the jute bagging made it possible to dump 54,000,000 bushels of her wheat into the maw of English consumption. Austrian-Hungary gave England 18,000,000 bushels last year. The Argentine Republic sent 9,000,000 bushels. All these nations have taken the English market away from the American farmer in ten years to the amount of 125,000,000 bushels of wheat. England being the only country that buys wheat and these outside countries being willing to lay wheat down in Liverpool at one dollar, the Englishman will not pay us any more than what he can buy of other folks for. He has never yet been known to sacrifice himself in behalf of any other country.

A bushel of wheat in Madison is worth 72 cents. It costs 21 cents to lay that down in Liverpool; wastage is 2 cents,

insurance, commissions and elevator charges are 5 cents; add this to the original 72 cents and you have one dollar. Wheat was selling last week in Liverpool at $1.02 a bushel, and yet Wisconsin farmers are preparing to sow more wheat. In 1882 English farmers raised four million acres of wheat, but this outside competition has so reduced that acreage that in 1889 it was only two and three-quarter million acres. English wheat sells this year in England at the Exeter market at 90 cents a bushel. Russia has today a surplus over the foreign demand of 18,000,000 bushels of wheat. Were it not for the duty of 20 cents a bushel, Russia would unload her surplus in the American market.

### Our National Crop.

We raised in 1889, 72,000,000 acres of corn producing two billion one hundred and fifty-six million bushels. England and the continent only want one hundred million bushels, leaving one billion fifty-six million bushels in our hands. Fifty million acres of corn fodder are about the same as wasted. One acre of corn and fodder in a silo will feed a steer a year. In Ohio on high priced land it cost $12.25 an acre to raise and silo one acre of corn, allowing three dollars as interest on the land per acre. Those fifty million acres of corn if theyhad been handled economically, would have fattened fifty million beef cattle. On the contrary one-half of the feeding value of those fifty million acres was thrown away. Do you think the ranchman could compete with you in the production of cheap beef if you fairly and resolutely determined that you would take advantage of what you annually waste, and so establish profit where loss now exists?

### Too Much Crude Thought and Crude Effort.

What is it that a man has to sell? Skill. If he does not sell skill, he sells to kill. Now, here is a thought which I wish were elaborated until it swelled to the size of our necessity. The trouble with Wisconsin farmers, very largely, is a lack of the sale of *skill*. Men are putting crude thought and crude effort into the production of farm products and contenting themselves with that condition, thus selling crudeness and not skill.

### Lack of Skill.

An illustration: The town of Watertown is twelve miles from the town of Koshkonong in Jefferson county. The town of Watertown has the best land, and everything to its hand in the way of markets, as nicely as it could ask. In 1885 it produced 83,000 pounds of butter, which, because there was no skill used in the production, sold at an average of twelve cents and eight mills per pound. The town of Koshkonong, twelve miles distant, produced that year, 124,000 pounds of butter, which, by virtue of the use of better skill, sold for twenty-one cents and eight mills per pound, an increase of nine cents a pound. What the town of Koshkonong got the farmers of Watertown could have had. But no, they refused to pay the price of success; they paid no attention to skill. Now, what was the amount that they lost? Mind you, they had produced the butter, they incurred all the expense of producing *good* butter. They had gone to the expense of producing 83,000 pounds of butter and they lost 9 cents a pound. It amounted to $7,470 or $3.71 for every man, woman and child in the town, or once and a half more than all their taxes. There wasn't a

farmer in that town but would have been willing to have gone from home to Watertown a dozen times to save his taxes. Yet for the lack of a little intelligent judgment and understanding put into the manufacture of that 83,000 pounds of butter the result was as you see it. Is there any legislation on earth that can save to those farmers the loss that they have imposed on themselves?

### The Farmers' Institute.

For this reason we gather in the Farmers' Institute. For this reason do we agitate this question, hoping thereby that we may fertilize our judgment and that thought, study and intelligence shall guide and control our destinies. What do they mean? They mean hope and encouragement to the farmer, they mean hope and encouragement to his family, they mean no additional burden but additional liberation. I have seen so many instances of it. I have seen so many men who have been leavened by the use of a little thought, taking hold of their destiny and thereby weaving for themselves a condition of prosperity, and doing it within the humble purview of a little farm, that I believe more than ever that "knowledge is power." I believe, to-day, that the plain simple truth with us is that, if we work out our salvation, we must do it not only with fear and trembling, but we must do it with a clear perception that knowledge and skill is to be our saviour. These are the true solvents; here is the philosopher's stone. Education is to be for us the final solvent.

### What Is Education?

Passing down the River Nipigon, way on the north side of lake Superior, I had an idea forced upon me of the value of education. I was in the hands of two Indians in a birch bark canoe, the river full of rocks and with rapids flowing, in places, at the rate of twenty-five miles an hour. One goes gliding along easily and swiftly when suddenly the river dashes over the brow of a hill and at the rate, as I said, of twenty-five miles an hour—you are precipitated down with a swiftness that appalls you. You see a rock rising as high as this building in the midst of the stream, and you say to yourself, "It cannot be in human fate that we shall escape that rock." You see yourself borne swiftly toward it. You are about to commend your soul to your Maker; you look inquiringly into the eyes and faces of those Indians to see if you can trace your destiny there. Not a muscle moves, not an indication of what they know and can do. But just at the right moment, as you reach the point of the reflex action of the water against the rock, a skillful turn of the paddle—not an unskillful one—and your danger is over and you dash by to meet another, and so on, for forty miles down the river, you find yourself constantly committed to the education and skill of those simple sons of the forest. What have they done? They have studied out *principles* which will guide them and which will bring them protection. They have studied the forces of nature. It is education in the highest sense of that word, it is education in the highest reach of the thought. It is by becoming masters of those forces that we make nature serve us as she should serve us. She never serves any one without skill. Therefore in our struggles, in all of our gettings, let us get understanding; let us learn that we must sell *skill;* that for every particle of our product that goes out crudely, that much is marked with the stamp of loss; that we must in these days become *skillful* farmers.

**The Value of Hard, Common Sense.**

Here is an illustration of the value of understanding. A dollar's worth of wheat sent to Liverpool will cost, as you see, in the neighborhood of 21 cents. Yet there are thousands of farmers who persist in subjecting that dollar's worth of hard work to that very condition. Here are two silver dollars; this is the wheat dollar in my right hand; this is a cheese dollar in the left. There are a hundred cents in each one, no more and no less. That wheat dollar pays a tax of twenty-one cents to get itself to the consumer; that cheese dollar pays a tax of seven cents; if it be butter it pays five. Now, my friends, here is one of the illustrations of the necessity of every farmer concentrating his product, reducing the crude product, that is, concentrating values and reducing bulk. You see there are but a hundred cents in each dollar, and yet the wheat dollar pays 14 cents more than the cheese dollar and 16 cents more than the butter dollar, in the simple cost of transportation. But says the farmer, "the railroads charge me too much on this wheat dollar." They may—they will if they can. But let us look at it a moment. To carry $2,000 worth of wheat in the old standard cars will require six cars. To carry $2,000 worth of cheese will require one car—$2,000 worth of butter half a car. Can a railroad company, build, equip, man and run six cars for the price of one car, or for the price of a half car? It is preposterous to think so, and, therefore, if we compel the railroads to carry bulky products for us, we must bear the punishment that that folly brings.

These are economic questions, but they reach down to the roots of our being. They take hold of our destiny, and I submit them as "A Few Plain Thoughts Upon the Causes of Our Present Agricultural Depression."

# SILO SESSION.

## SAVING AND APPLICATION OF MANURE.

By JOHN M. TRUE, Baraboo.

SUPT. MORRISON—I am very sorry that we have not a larger attendance to listen to the papers and discussions that we are going to bring before you today, upon the same line nearly that we had yesterday; but there is one consolation, —we are not working for this audience alone; we are working for an audience of over a hundred thousand that our bulletin will reach, and consequently we will do just as good work as if the hall was crowded.

In the absence of the governor the subject of the "Saving and Application of Manure" will be introduced by Mr. John M. True, who will give you a short talk on the subject, to open up the general discussion.

**Saving and Application of Manure, by Hon. J. M. True.**

It is always embarrassing to appear in the position of substitute for another speaker; it is especially unfortunate when one is called upon to speak upon a topic that has been assigned to such a speaker as Gov. Hoard, and this embarrassment is not very much relieved when we consider the importance of the topic that I am called upon, upon the moment, to present to you.

In my opinion the saving and application of manures upon the farms in Wisconsin represents one of the greatest leakages that our attention is called to; and while we may not be able to agree (as we doubtless shall not, at this time), with reference to the best methods, especially of the application of manures to the different soils, still there is ground that is common to all parts of the state and to all methods that is worthy of our consideration.

**Save the Liquid as Well as the Solids.**

When we come to recognize that it has come to be an accepted fact that the liquids in connection with the droppings of our live stock are equal at least in fertilizing value to the solids, the importance of the proper saving in our stables of the manures is seen in its full importance. Therefore, we will pass over this subject with the simple statement that a sufficient amount of bedding or absorbents of some kind should be used in the stable in order that there may be no waste in this direction. Passing from that to the handling of manure after this, I have to say that I have no doubt that under favorable circumstances, the greatest saving of fertilizing qualities of manure is obtained where they are drawn directly from the stable and applied to the land; but still there is a question yet that seems to me is not fully settled, with reference to the percentage of loss that may occur under certain conditions, depth of snow, rolling surfaces of fields to which the manures are applied, that render this uncertain whether this may be accepted as an infallible rule upon all of our farms.

### Our Experience.

I propose this morning to speak especially of my own methods with reference to this matter, allowing other gentlemen who entertain different views to present the other side of the question. I have not been accustomed to draw the manure from my stables directly upon the field. Neither has it been a custom with me to remove the manure from my sheds to the fields and apply it to the soil in the spring of the year. I find that I am too busy in the spring of the year at putting in my crops to stop and apply the manure to the soil, and indeed it has been a question in my mind, during the past few dry seasons, whether those farmers that have made a practice of drawing green manure from their stables and yards and plowing it under, have received any great benefit from such application of the manure. Briefly, then, I am accustomed to piling, with considerable care, the manure as it comes from my stables, and retaining it until the next fall before it is applied to the land. I aim to use a great deal of care in the location of these piles and the manner in which they are constructed and handled. It has come to be a fact accepted by all that the great loss to manure occurs by leaching.

As was drawn out incidentally in the discussion yesterday, there is doubtless much less loss in the escape of gases from manure, even when undergoing fermentation, than is generally supposed. Not every offensive odor that is found around a manure pile represents escaping fertility.

### Loss by Leaching.

The great loss that occurs to to manures before applied to the soil is from leaching, through being spread out loosely over the yard, coming in contact with those little rills that are allowed to flow through the barn-yard, or by being placed, as represented in the picture before us, under the eaves of the building where the drippings from the roof fall upon it, washing out the fertilizing qualities of the manure, from which place they are conveyed into little pools that either dry up or are evaporated or allowed to flow off into the pools in the yard, where the fertility is wasted. Then, locate the piles of manure where they will be free from contact with the drippings from the stable, and free from the little rivulets that sometimes may flow across the yard. I am accustomed in starting the foundation for a manure pile to lay it out with the regularity that I would a straw stack. I suggest that the top surface should be flat. My farm stock is largely horses, and you know that manure from the horse stable is much more liable to fire-fang, as we say, and become injured from this source than any other manure that we have around our stables.

### A Compost Heap.

Keep the manure piles flat on top; spread the amount that is wheeled or drawn from the stables daily, evenly over the surface, upon which the stock are allowed to run as they will, and there is no danger of fire-fanging. I think it is a good plan to mix the manure from the cow and horses table in one pile. There is a lack of that fermentation in one case, which is necessary to produce good results, while the tendency toward too active fermentation of the other kind, has a tendency to make both kinds of manure better for the land. I think if the manure pile is arranged in the manner I have spoken of that there is very little loss from leaching. Talking with a gentleman here a few minutes ago I was struck by an illustration

of this point; he stated that it has been necessary in his experience, while drawing manure from his stable and piling it up in great piles, to even throw water on them to prevent them from heating to too great a degree. If this is the case it is not to be supposed that there will be a sufficient amount of rainfall from the clouds to injure the manure from leaching.

### Surface Application.

Just a word as to the application of manure to the soil. I am aware that with the diversity of soils represented by the farmers in this audience, we cannot lay down any general rule alike applicable to all—sand, stiff clay and black loam will require different applications of manure to get the best results. My soil is a black loam soil, with a clay subsoil. I want to say that, in my experience, I find I get much better results in crops and in the staying qualities of the land, by a surface application of manure. Let this manure be applied in the fall of the year, either to the meadow after the hay crop has been cut, or, if upon land I wish to crop the succeeding year—as is usually the case—with the corn field—I first plow and then spread the manure evenly over the furrows, directly from the wagon.

### Wasteful Method.

I wish to speak against a method, wasteful both of labor and fertility, that seems to prevail in a good many parts of the state, of drawing the manure to the field and piling it in neat little piles to be spread in the future over the surface. It seems to me the manure can be spread directly from the wagon, and then, if it leaches, the leaching is just where we want it, in order to prepare the soil for the crop we propose to put upon it. I am aware that with a stiff clay soil, where the mechanical effect of plowing under manure is wanted, this rule may not apply. I think it applies in greater force, perhaps, than to the soil I spoke of, when the land you wish to manure is of a sandy nature.

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### DISCUSSION.

W. H. COLE—On soil like yours what crop do you like to put manure on immediately after?

J. M. TRUE—I apply immediately after the corn crop, and sometimes apply to winter wheat as a surface dressing.

W. H. COLE—How about pastures and meadows?

J. M. TRUE—I apply somewhat to meadows,—apply the well rotted manure after haying time.

R. B. BROOKS—Isn't there danger of taking it up the following season with the hay?

MR. TRUE—Not if the manure has become as well rotted as it will be, if it is handled in the way I suggest.

R. B. BROOKS—Do you ever plow under?

MR. TRUE—Not on my farm.

J. S. JONES—Have you ever noticed that in extremely dry seasons, when the manure has been applied as you suggest, immediately after the hay crop is removed, whether there was a tendency to draw the sun and to thus injure the grass?

MR. TRUE—I will state that I have never noticed it.

J. S. JONES—It has been my experience that it operates in that way.

R. B. BROOKS—With such dry falls as we have been having, don't you think there is waste in applying manure as you suggest?

MR. TRUE—I am aware that the idea suggested is a common one. The manure presents a shriveled appearance

and looks as though it might be of less value, but when the rains fall again the same fertilizing qualities may be leached out.

ORANGE JUDD—In your corn ground, don't you plow in the spring at all?

MR. TRUE—No; when I apply manure in the fall, I find that I can get better satisfaction by using a disk harrow in the spring.

C. P. GOODRICH—Do you think it a good plan to apply the manure to the pasture?

MR. TRUE—I cannot speak from experience.

C. P. GOODRICH—I apply more that way than any other. It is true that for a few weeks the stock will not crop the grass very close, but they have the rest of the field to feed on, and after two or three rains they will feed that off. I draw it out when I have opportunity in the summer time. It not only furnishes more feed, but it makes a stiffer sod to turn under.

MR. TRUE—How deep would you break that sod, Mr. Goodrich?

C. P. GOODRICH—I wouldn't plow more than three inches deep.

J. S. JONES—Where the manure is coarse and not fit to put on the meadow, but fit to put on where you want corn, by plowing about three inches and a half deep, I think in a dry season, the corn roots going down under the sod into this manure of a coarse nature, has a tendency to hold the moisture and I think is beneficial to the corn crop.

MR. TRUE—I want to say that two years ago it was very dry, and I know of places where manure was plowed under then and when they plowed the land up afterward, that manure was plowed up in just about the same condition as it was when plowed under. I didn't see that it had rotted in the least during the entire summer.

J. S. JONES—Don't you think the manure has a tendency to hold moisture?

MR. TRUE—It would seem to have theoretically, but when turned into a dry soil it doesn't seem to practically.

W. H. COLE—I think coarse manure plowed under has a tendency to retain moisture. A good many times we have a good hard rain in the spring and then it is dry the rest of the season. If we can get the manure plowed down and wet it will retain the moisture.

H. C. THOM—If you don't get it wet you can't get corn enough off of forty acres to keep a steer.

C. R. BEACH—A neighbor of mine plowed under a crop of rye and the crop of corn was almost a failure; the rye dried out and the corn was not nearly as good as it was on the field next adjoining, owing to the coarse rye being plowed under.

C. P. GOODRICH—I had a little experience with corn two years ago. I put the coarse manure on in the spring and plowed it under, it dried out so I pretty much lost the corn crop, and I am not sure but I pretty much lost the manure.

MR. TRUE—If this soil is thoroughly wet down six inches deep in the spring there will be sufficient moisture in the soil as not to need manure to tide over the dry season, and manure would be unnecessary, and under those circumstances it would give better results to apply it to the surface.

R. B. BROOKS—I would like to ask what time that rye was turned under?

H. C. THOM—I would say that Rockcounty had a peculiar experience of this kind two years ago. They raise large quantities of tobacco in that county and a good many put in rye that they may

turn it under. They did it this year, which was a very dry year and I didn't see an acre of tobacco that grew on that kind of land. They plowed some of it as deep as eight inches, throwing this heavy crop of rye under and planted the tobacco on that seed bed; the result was that this rye which was turned into the bottom of the furrow effectually retained almost all the moisture that was below it and it was unable to come up through to the surface and the result was that that earth above the rye was absolutely dry and powdery, and they got no returns. The same year I planted twenty-six acres of corn that was heavily manured and I turned the manure under and there wasn't corn enough to swear by. I planted another field of corn that wasn't manured at all, and that bore a heavy crop.

MR. FRANCE—Had it been a dry season how much good would that manure have done on top?

H. C. THOM—The more manure on top the better, for it would answer the same purpose that the rye did at the bottom of the furrow, it would retain the moisture; turning a stone over a little piece of earth is the best thing in the world to keep the earth moist.

C. R. BEACH—Had that rye been on the surface of the ground would it have furnished a mulch that would have kept the ground moist?

H. C. THOM—It is my opinion that it would.

QUESTION—How about top dressing?

C. R. BEACH—I knew a man who put a shovelful of manure on the top of each hill of corn and all summer he was digging to get his corn hill.

VOICE—I have tried it with good results.

C. R.—BEACH—I think that manure on the top of land that you are going to plant is the very best way to apply manure, and I have no doubt that it is best to apply green manure.

GEO. VAN HOUTEN—I spread the manure on top. It is sometimes difficult to spread it just where you want it. I spread it between the corn rows, sometimes before the corn is laid by, and sometimes after, and then afterward spread the manure. In southwestern Iowa in the last three or four years we have found that manure plowed under has in many instances been a positive damage, while as a top dressing it has always given beneficial results.

VOICE—With us the old style way of plowing manure under has been altogether abandoned; we apply it either to meadows or to pastures or spread it on top; in general there is more applied to meadows than in any other way; as the manure is accumulated during the winter it is immediately hauled out on the meadow and spread.

THOS. CONVEY—I prefer to haul out directly from the barn. I know that about fifty per cent. of the manure in this country is allowed to go to waste, if it is allowed to remain around barns and in yards. The style of allowing it to remain in compost heaps is better than allowing it to lie under sheds or in yards where it is allowed to leach away. There is less loss in applying manure of the right quality to the soil and it is a saving of labor. You have more time to handle it in the winter time, and it is more convenient to haul it then. I run my cattle in sheds and haul the manure directly from those to the field—that is, of my young stock. The dairy stock are kept in the barn where there are water tight manure gutters, and everything goes directly to the field. I prefer to top dress early fall plowing for corn ground,

but cultivate the manure in well in the spring; I would prefer to have it in good condition, of course, not having too much straw in it, but yet I have failed to see any damage done to a crop by top-dressing with manure, as has been stated. Of course, if you are careless in cultivating, and don't have it well mixed up with the soil, there is a disadvantage in handling it in this way, as it dries out; but with thorough cultivation, I have not been able to find anything that gives better satisfaction than to apply the manure directly to the field and spread it as hauled. The main loss in handling manure is by leaching. All manures must be in liquid form to be available as plant food, and the leaching should take place in the field in preference to barn-yards and about the stables. I have applied manure to pastures with decided advantage. Cows will not crop the grass so closely; they do not relish it so well as where it is not applied, but the pasture will yield double the amount of feed and will stand a greater amount of drouth. The effects of manure are not as apparent in a dry season as in a wet one, of course, because the fertilizing qualities of the manure are not leached out so much, but they remain in the soil, however, and when we have a wet season then the effect will be apparent on the soil.

ORANGE JUDD—I want to call attention to the value of concentratad manure upon hilled crops and those in drills, more immediately around the growing plants. I have advocated for years the importance of growing corn, for instance, of concentrating a little well prepared manure on the hill.

MR. RUNDELL—Our usual method here is to haul out the manure before plowing in the fall. It seems to me that hauling manure on the plowed lands would be very hard on the teams in this country; they would sink in a good deal, and it would also make ditches where the water would accumulate and wash away the soil. I don't think it matters so much whether we get the benefit of the manure the first year or not; we will get it sometime; get it on the land and we will get the benefit of it sometime.

C. G. HENDY — A few years ago I had two objects in view with reference to a piece of ground—I wanted to kill some quack grass that was in it, and I wanted to get a crop of corn, and the question was, how I should accomplish both. I plowed the ground in the fall and then again in the spring. I prepared the land and put in my corn and went right to work with two teams and three wagons and manured six acres. Some of it was well rotted manure, and I supposed when I started I had enough well rotted manure to put over the whole piece, but I found I hadn't and so I applied green manure. I would never apply green manure in that way again. With the well rotted manure I had good results; where that was I had good corn. Where the green manure was, I hadn't so good corn. I had a fair crop of corn and succeeded in killing the quack grass.

T. J. VAN MATRE—I have a barn 50x70, which sits upon a basement nine feet high. A gangway passes through the middle of this barn. Above and on one side of this gangway we have room for twelve horses and five or six cows that we milk during the winter. The stock cattle are kept below in the basement. All the manure made above drops into the basement and is allowed to remain there until the fall of the year when it is hauled out. There is no leaching nor

no drying out by the sun, and where we put the manure we find that one load or one ton of it is worth two or three tons preserved as Mr. True stated, where it is piled up in piles and allowed to lie during the summer exposed to the rain and sun. Usually, if we can, we put our manure on the meadow; we have experienced the best results in that way, because the tendency of manure is downward, and the nearer you can get it to the surface the better.

JAMES SPENSLEY—My farm is a heavy stiff clay soil. I have obtained the best results by hauling the manure out all the time just as fast as it has accumulated, spreading it over the ground that I intended to plow in the spring. I plow as shallow as possible, cultivating the ground and getting a nice seed bed, plant the corn and we have splendid results. Of course, I agree with all the gentlemen, that all the manure must be saved, both liquids and solids; it is necessary to have it in that condition. But the difference is in the soil. What is the best method in one section is not the best method in another. As I said before, mine is a stiff clay soil, and the application of the manure in the way I have suggested makes a fine, rich, mellow seed-bed for the seed to grow in.

T. J. FLEMING—I think the gentleman's head is level. I, like all the gentlemen who have preceded me, am of the opinion that the manurial products of our animals is a very important subject. I think it is the ground work of our success in farming. Some of the gentlemen I cannot agree with, but a couple of them I do agree with. My practice for four years in handling manure has been this: There is an alleyway between my cattle, eleven feet in width; as my stock are driven out daily about eleven o'clock to get their drink, the manure found behind each row of cattle is thrown to the center of the alleyway and permitted to pile and accumulate there for about three days. I should have stated, however, that I always use a sprinkling of land plaster and horse stable manure, which makes a combination adequate to absorb the liquids, especially the ammonia, the greatest element of fertility to be found in the manure, having a chemical value of 17 cents per pound.

There is one point in this system of handling manure which has not been brought before this convention and I think it should be. All who feed to their animals a corn ration, and I believe all farmers should and must do so, if they would have profit, will find that there is a portion of undigested corn ration in this manurial deposit. If it is hauled directly to the field you are losing the feeding value of that undigested portion. In order to govern against that I permit my stock hogs to go into the barn basement while the animals are out getting their drink, and I find they are most diligent workers, going through the manure piled there and taking out every portion of the undigested corn ration, and I then feel satisfied that that corn feed has either been converted into milk by the cow or pork by the hog. I have all of the liquids combined with the solids, and as chemists tell us that the liquids of the manure represent about 70 per cent of its fertilizing value, I believe that it behooves all of us to handle this manure so as to get this liquid portion as well as the solid on to that portion of the farm which, in our judgment, requires it most. As Mr. Convey told you it is the cheapest time to put the manure upon the land. The help which I must

have upon my farm is able to do the regular routine work and put this manure upon the farm without materially affecting the other work. It is a very pleasant fact for any farmer when spring comes upon him to know that the manure has been spread evenly over the field he wants to put it upon. It is all right possibly for those men who claim they put it over until fall, but I am speaking of a great mass of people who don't do that way, but who simply let it accumulate in the barn-yard every winter, and are then forced to draw it out upon the farm at a time when time is especially valuable. The land is soft and the manure can't be put upon it without cutting the land up, labor is valuable and it makes a combination against the farmer that should be carefully guarded against. By keeping that manure in the barn until fall you have lost the fertilizing value of it during the season. I continue this hauling out of manure until the first of April, when I intend the land for corn, as is usually my practice. I find it not profitable to continue hauling directly to this field later than the first of April, but up to that time I find the manure has sufficient time to leach and form a good mulch upon the soil.

H. C. THOM—I would like to ask three or four questions on this subject. If a man has got forty head of young stock and they are running in a barn and the manure is left there until spring, as Mr. Van Matre has said, I can't see that he has lost any liquid; I can't see that he has lost any solids; I can't see but that he is in the best possible condition to distribute the manure upon the land. I can't see that it costs as much to haul it then as it does in the winter time. I can't see but that manure in the fall, when carried out as Mr. Van Matre says, will take one-third less time; the land is in better condition to scatter it over than in the winter; the manure is not two-thirds, or perhaps more than one-half as much in quantity and it is in the best possible condition. Then again there are two-thirds of the farmers of this state that don't do their plowing in the fall, and if they don't do their plowing in the fall, there isn't a place to put the manure if they haul it every day in the winter, unless they put it on the pasture, and no man can stand on a wagon and intelligently distribute that manure upon the pasture as it comes from the stable in the winter time. A man can go to work with his teams in the fall and distribute this manure a good deal easier.

MR. TRUE—Before the closing of this discussion I want to say that I think there is a disposition on the part of some speakers, as there is in every new thing that seems to be suddenly popularized, to give too much importance, by giving credit for loss of too much fertility by leaching. What I want to get at is the remark made by Mr. Van Matre that one load of manure housed as he suggests is worth a half dozen stored in heaps as I suggested. That being the case, the results must be remarkable on his land. I grant that upon the average farm this would apply, but I do claim that if the manure is carefully piled, as I suggested in my leading remarks, the loss from leaching is very inconsiderable. Another point is the advantage that we derive from the rotting of the manure before it is applied to the soil. Recent experiments made in Michigan show that this is much more considerable than we are inclined to give credit for. I do believe that perhaps there is a compromise between the positions assumed here, by

building sheds in which the manure may be stored when taken from the stables; in this way the danger of leaching is avoided and we are able to retain the manure until it is well rotted.

THOS. CONVEY—I would like to ask Mr. Thom if he would recommend storing manure on a dairy farm?

H. C. THOM—Yes.

J. S. JONES—You said that you hauled the manure on land you wished to put corn on; do you haul it on sod land and plow in the fall?

T. J. FLEMING—On sod which had been pastured before, and invariably get a good crop. I believe the practical question for most farmers, who are not peculiarly circumstanced, as Mr. Thom and myself are, is, shall we haul direct to the field versus storing in the barnyard. If such men do not haul directly to the field what are they going to do? They are going to cart it out and let it lay in the barnyard. I say to such farmers they should, even if obliged to hitch up every second day, draw that manure to the field and spread it, rather than to let it lie in the barnyard.

H. ROBBINS—I let my stock run out in the barn-yard to the clover stack, and the straw strck, letting the hogs and cows run together, and let them make all the manure they can until after haying and harvesting; I don't touch the manure until I get through harvest; then I haul the manure and spread it and at the same time put one team to plowing; I plow very shallow. Then in the spring I put my disk harrow on to the land and pulverize it just as fine as I can and plant it to corn, and the next year I put it to oats and seed it down to clover and timothy, about half and half; I have a splendid crop of oats, and the next year I have a splendid crop of clover, andthe next year I have a splendid crop of timothy. I have about 40 acres and it takes me just about four years to get around.

L. H. ADAMS—Is it a fact that we can follow either of the extremes we have heard here? Here is Mr. Thom feeding for beef principally, and there is no question that Mr. Thom is all right in the position he has taken in regard to feeding for beef; but here is a dairyman with 30, or 40 or 50 cows, who has got to have his affairs arranged so as to get along with as little bedding as possible. Then there is this question of how to apply the manure. The great objection is the coarseness of the manure, how to handle it and get the fertility out of the manure without the coarse part. We don't care for the coarse part. Now if the question hinges upon getting all there is in the manure, it has occurred to me we have left one point in the discussion. Why cannot farmers, at a little expense, save the liquid part of the manure by itself? That represents from sixty to seventy per cent. of the entire fertility of the manure. Why not save it by itself, and then you have got it in a way that you can apply it to any crop, to corn or whatever crop you choose, and the roots will take it at once; apply it on the meadow and there is nothing there for the hay rake to take up later on. Wonderful results are reported from the use of liquid manure in the manner suggested. This liquid manure can be saved easily by having a cistern running underneath the floor of the stable, which cistern is cemented so as to retain the the fluid. Let the stable floor have an inch taken out of it back of the cows, and let it also have an incline of half an inch, sufficient to drain the liquid manure down into the cistern, where it

may remain until the next spring; then it may be pumped from the cistern into a tank on a wagon, and may be taken out on to the meadow or wherever it is wanted and the flow regulated by some such an arrangement as is used on a sprinkling cart, and the liquid allowed to flow out upon a board and to spread upon the ground. Liquid manure can be applied in that way cheaper because it is condensed, and you can take out more fertilizing value in one load of liquid manure than in a half a dozen loads of common manure. Why not save that manure in the most perfect manner possible?

SUPT. MORRISON—I think that every man is confronted with this problem upon his own farm, and I think that the first thing he ought to make up his mind to save and to utilize all of the manure that he possibly can. That is the first thing that I would recommend. But you see you are surrounded by so many different conditions. Here is Mr. Thom feeding almost entirely for beef; here is Mr. Fleming running a winter dairy; and here is another man who has only got five or six cows; so that all of their conditions are dissimilar, and it appears to me that the only thing I would attempt to do would be to save that manure so that I could utilize it to the best advantage. I am very confident that there is a great waste in this respect in the state of Wisconsin; it would appall us if we knew the extent of the waste; it would more than pay our taxes, far more. Occasionally we come across a farmer who regrets that our state expends $12,000 for farm institutes, but that is nothing but a drop in the bucket to the amount wasted in the handling of manure. I haven't any doubt that upon the farms of Wisconsin we are losing twenty-five or thirty millions of dollars, but it runs away so quietly that we do not notice it.

The only crops that pay are large crops and are produced by having the land rich and thorough tillage. This is secured by plowing under growing crops or the direct application of barnyard manure.

Ordinarilly, commercial fertilizers are out of the question; the most profitable way is to manufacture on the farm by keeping live stock. There is a great difference in the value of manure. Straw manure and manure made by using bran or oil meal are very different. If the food is rich the manure will be rich and *vice versa*.

The elements that are lacking or apt to be lacking are nitrogen, phosophoric acid and potash, and which we wish to supply.

Different food contains these elements in different proportions. A ton of bran after you have fed it and extracted the feed value is worth 80 per cent. of its cost for manure. You can afford to feed largely of bran.

Malt sprouts is also a profitable feed and is very rich in elements of fertility, and best fed in connection with wheat, bran, corn meal, etc.

After you have secured the manure the question of applying to secure the greatest returns, don't let the manure heat and become fire-fanged, as the most expensive element, nitrogen, has evaporated. Valuable elements can also be washed out. The liquid as well as the solid parts of the manure is the most valuable, but to receive the greatest value they should be combined. How shall we save the liquid? will depend largely upon your surroundings. Use straw as an absorbent, or any absorbent that is most convenient. In the application the best way is to draw directly

from the stable and apply upon the land; if not convenient let it accumulate in the stable, it appears slovenly, but, I believe, it will retain all the elements of fertility that it possesses. Make the manure and utilize it by getting it out on the land and not waste its valuable properties by heating, evaporation or leaching.

The present depression in agriculture, low prices, etc., will teach us some valuable lessons. It is the little economies we must look after. The little leaks and wastes that run away with the small profits. Different economies make all the difference.

The owner of poor stock must visit his neighbor and learn of him, and note the difference. Of two men on lands originally identical one is thriving, the other says "farming don't pay." Prosperous farmers adopt systematic methods. Our best thinkers are getting the most profit. Attend the farm institute and question the most successful. Take courage. The world must be fed, and mouths are rapidly multiplying, while the acres cannot increase. The depression of farm property cannot last. Be hopeful, economize, improve, stop all the wastes. Different economies make all the difference.

## SILO EXPERIENCE.

By L. H. ADAMS.

SUPT. MORRISON—The next question that we are going to present to you is one of vital importance, that is the silo question. This subject will be introduced by Mr. L. H. Adams, the superintendent of the Experimental farm.

L. H. ADAMS—Mr. Chairman, Ladies and Gentlemen: This very new and yet old question of the silo once more. It seems to be getting old to me, and yet I have been wondering why it is that we have got to prove, and reprove, and talk and preach about the silo and the merits of it, when we have such men as Hiram Smith, C. R. Beach and Mr. Goodrich who have used the silo, stand up before you and tell you their experience and what it has done for them. And yet we have got to pound away as we have to do on so many farm topics.

A close and intelligent observer cannot have failed to notice that the inquiries on silo topics are taking a new direction. It is not so much, Does it pay to build a silo, as it is, How can we perfect the silo and get still better results? I can see we are making a great deal of progress, but we have got very much to learn yet on this question. There is a great deal about the fermentation in the silo that we do not understand, and it will probably be sometime before we do, but we know enough about it already to enable us to preserve our corn crop in a way that we cannot do by any other means.

I shall quote a few experiments to you, showing what ensilage will do when compared with dry fodder. One of our experiments lasted forty-two days. We fed sweet corn ensilage against the same kind of dry fodder.

Four thousand nine hundred and sixty pounds of ensilage produced 1,688 pounds of milk, which made sixty-two pounds and three ounces of butter; 1,227 pounds of fodder produced 1,487 pounds of milk, which made fifty-eight pounds eleven ounces of butter; excess in favor of ensilage, 201 pounds of milk and three pounds eight ounces of butter.

Another experiment with B. & W. ensilage corn we fed for a period of twenty-eight days; 3,600 pounds produced 1,100 pounds of milk, which made forty-four pounds ten ounces of butter; 820 pounds of fodder produced 1,113 pounds of milk, which made forty-four pounds nine ounces of butter, excess in favor of fodder thirteen pounds of milk, and in favor of ensilage, one ounce of butter.

In another trial where whole ensilage was fed against whole fodder—I mean by this, corn that was taken from the field and laid into the silo without passing it through a feed cutter—of B. & W. variety, 2,298 pounds of ensilage produced 694 pounds of milk, which made thirty pounds four ounces of butter; and 887 pounds of fodder produced 715 pounds of milk, which made twenty-seven pounds and fifteen ounces of butter; excess in favor of fodder twenty-one pounds of milk; in favor ensilage, two pounds five ounces of butter.

Ensilage comes the nearest to taking the place of green grass in the winter time of any feed we can give our cows, and as you are well aware that the butter comes quicker and nicer in the summer time, when the cows are on pasture, than in the winter when they are on dry feed, you can understand the effect that the ensilage has upon the cows.

Let us consider the ensilage question in connection with beef production. Eight steers were divided into two lots of four each and were fed for 36 days. The first lot were given 7,898 pounds of ensilage in all; it was mixed B. & W. and a flint variety of corn; that is, they were fed 55 pounds each daily and they gained one and one-half pounds daily. The other lot of cattle ate 3,502 pounds of ensilage, which was nearly 25 pounds each daily, together with 14½ pounds of shelled corn, six and three-fourths pounds of bran, and gained three and seven-tenths pounds each daily. Four hogs ran with the steers getting the corn, and by feeding 92 pounds additional to them they made a gain of 100 pounds.

Therefore, to make 100 pounds of gain from ensilage we have 3,558 pounds of ensilage at $2.50 per ton, $4.44. To produce 100 pounds of gain of steers and 100 pounds of gain with hogs, required 669 pounds of grain at $15 per ton, and 654 pounds of ensilage at $2.50 per ton, or a total of $5.82.

If we allow that an acre of land will produce 25,000 pounds of wilted ensilage, such as was used in these experiments, since 3,558 pounds made 100 pounds of gain with the first lot of steers, an acre of ensilage will give over 700 pounds of gain. So much for experiments regarding ensilage and dry fodder.

Now what other advantages does the silo offer over the old method of curing fodder and stacking it, or leaving it in the field, as is the ordinary practice. The first great advantage is this—the silo enables you to take the green crop and preserve it one year the same as another. Can you do that when you undertake to cure your corn? When fodder is stacked there is a loss equal to that which takes place in the silo. Last fall we took a shock of corn cured in an excellent manner, and after

taking a small sample of it for chemical analysis, we wrapped the remainder up in a sheet, so that it could by no possibility be mistaken, and we put that shock in the center of a stack, where it was not exposed at all, and where it remained for five months. We took it out a short time ago and cut it all up and took another sample for chemical analysis and found that the loss of feeding matter in that shock was 22.6 per cent., while we only allow about 10 to 15 per cent. loss in the silo.

**Another Saving.**

Another advantage that the silo offers over the ordinary process of curing fodder is in the lessened cost of taking care of the crop and getting it to our animals. How does it do this? First, by cutting off the expense of husking the corn. It will cost you an eighth of the expense of a corn crop to husk it alone. By putting the corn into the silo you do away with the expense of grinding, which will cost another eighth. There is a quarter of the corn crop for those two features, that you can cut off and it is this lopping off of the square corners that we have been turning so long that the silo offers its greatest advantages.

One more advantage of the silo is that it offers you a succulent food for your cattle in the winter time, and gives you better results as a consequence.

Perhaps you doubt my statement when I say that ensilage will take the place of a grinder. I have made a few observations in this respect which I wish to relate to you. On the Experiment farm, some cows were fed ensilage and others dry fodder, I noticed that there was not nearly as much corn in the excrement behind the cows being fed ensilage as in that behind the cows being fed dry fodder. I saved droppings for twenty-four hours behind the cows, or rather the droppings of two cows for twelve hours. Then I washed the grain out of the excrement thoroughly, and remember that if there was any error it was on the other side, it was rather in favor of my not getting as much corn out of the manure, than of getting all of it, for in washing it there was a good deal that washed off and we couldn't recover it. But I found that one cow in twenty-four hours was voiding that quantity (exhibiting can) of corn, that is the one that was being fed dry fodder, and the one being fed ensilage was voiding that amount. (Showing another can.) Ten per cent of the grain fed to the cow kept upon dry fodder was being voided, and not one per cent. of the grain was undigested when fed upon silage.

**Advantages.**

Now, farmers, it is time that we were coming down to sober, practical sense in regard to this silo. There is nothing gained by claiming all creation for the silo. It has enough of merit to commend it to the thoughtful consideration of the beef feeder and the dairyman, without making extravagant claims for it, and the advantages that it possess are substantially what I have told you, nothing more and nothing less. You do not take out all of the feeding value that you put in your silo. Why? Because it is burned up, destroyed by the heat that is generated in the silo. We are learning to reduce this heat. We at one time thought it was necessary, but we are learning to reduce it as fast as possible, and my last impressions and ideas in regard to the preservation of ensilage are that we have got to go back partially over the ground that we passed in our rapid change from over-weighting to non-weighting. I think we have got to take an intermediate position. We

know that when we first started out we weighted heavily and excluded the air, and then one man reported good results without weighting and over we went to non-weighting; but it is the exclusion of the air in the silo that preserves the fodder, and the more air we keep out the more perfect the preservation.

#### Some Weighting.

I give it out as my last impression that a little weighting is necessary, and that that is the proper thing to do in our silos. It may be done in this way: take a plank and lay it alongside of the wall, not tight up to the wall but off a half an inch or an inch, and across the ends of the silo also; then take nail kegs or barrels and fill them with earth and set them on these planks so as to compress it as rapidly as possible. The latest experiments in this silo question are to this effect, that the only advantage of heating in the silo is in aiding to exclude the air. When the mass begins to heat up you at once begin to see it settle down and pack, and when it is undergoing the settling process the air is going out of it, and the more that we can hasten that settling and the tighter we can get it, the more air it will expel and the better ensilage it will be.

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# SILO EXPERIENCE.

By WELDON VAN KIRK.

#### A General Success.

In a winter's intercourse with the farmers of Wisconsin, we have failed to find the man, who having built and filled a silo, has said he regretted the move. Occasionally the man has put in an appearance who has chosen to champion dry feed as a better ration than ensilage, upon the ground that it is a more natural food for winter. That it can be preserved cheaper. That there is less loss, etc. But it is a noticeable fact that all such persons are without experience upon which to base their conclusions. True, not all have reported entire success. Some have made partial failures from one cause, and some from another, but all have seemed confident of their ability to trace the cause of their trouble to some mistake that may easily be avoided in the future.

#### Who Need Silos?

The discussions of the subject at the institutes we have attended, while not marked by that enthusiasm so often aroused by the early advocates, has yet shown a degree of satisfaction on the part of men of experience and of inquisitiveness on the part of others, that denotes a possibility of extensive silo building for the future. After three years of personal experience and after having had an opportunity of hearing the ideas of scores of men of more or less extended experince, we have arrived at the conclusion that no farmer has any use for the silo who ordinarily has more fodder than he can dispose of to advantage with the stock that he keeps; who always has hay to sell and straw to be trampled under foot and who thinks corn stalks are not

worth cutting, and allows them to stand in the field and turns the cattle in for a few days after husking; whose cows habitualy dry up in the fall and remain so until spring, spending their days rustling around the yards and their nights tied in cold stables.

### The Silo, Success and Fertility.

On the other hand we believe that the man who realizes the necessity of extensive stock raising in order to maintain the fertility of his farm will find in the silo one of the most potent agencies for the accomplishment of his end. He who provides for his stock warm stables and wishes to produce milk in winter when it is worth most, or who wants a succulent ration for fattening steers, for young cattle, or even for sheep or horses during the long months when stock are otherwise obliged to live entirely upon dry and more or less indigestible food, will we believe appreciate ensilage. Nor is its use necessarily confined to winter; each of the past two springs we have had a little remaining that has been very satisfactorily fed the following August This year we expect to have left about one-fourth of our entire lot of silage which will go a long way toward piecing out short pastures next summer, and will obviate the necessity of cutting any of next year's crop for soiling purposes before it reaches a desirable stage of maturity.

### What to Build of.

To the man of limited means who must build cheaply or not at all we would still recommend the silo built of lumber. Wherever it may be built in the bay of a barn the material of its construction ought not to cost over fifty cents per ton of its storage capacity. The expense of our own was a trifle less than that amount. To the man who has capital at his disposal and wishes to build in the most durable manner possible and at the same time secure the very best possible results in the preservation of his silage we would say, build of masonry.

This may seem like heresy to persons who have kept posted regarding the teachings upon this subject of the past few years, but to such as think it impossible to preserve the best quality of silage in a stone or brick silo we would recommend a visit to the farm of Mr. J. W. Hays, of Alderly, or Mr. Schrader, of Hartford.

At either place will be shown silos of this sort by the owners who enthusiastically recommend the plan. At Mr. Schrader's we found an article of ensilage that for quality has not been surpassed by any of the numerous good samples it has been our good fortune to inspect. As a matter of course these gentlemen have taken the precaution to prevent frost from penetrating the walls by boarding up the outside in such a way as to form a dead air space. The walls of stone or brick are carefully built and plastered with water lime, as are also the bottoms of the pits. The only objection we are able to find with this method of building is the expense. As nearly as we could ascertain the cost of construction was about three dollars per ton—and cost with the most of us cuts a big figure. Undoubtedly where sufficient depth is attainable one pit is better than two or more.

We consider depth desirable, first because the silage settles more solidly and enables us to store a greater quantity in a given space, and second, there is a smaller percentage of the whole damaged by exposure at the top.

In silos less than 25 or 30 feet deep we prefer the partition, not from any benefit to the silage to be derived from fill-

ing first a few feet into one pit and then a few into the other, but because we dislike to have so large a surface exposed while feeding out. We prefer feeding from the top, *taking care to keep the surface level* rather than to cut it down in sections, or feed from a slanting surface, for by the latter method, unless the building be long and shallow, a larger surface will be exposed than by the former method.

The variety of corn that may best be depended upon is still and may perhaps remain a somewhat unsettled question.

So much depends upon soil and climate that a kind suited to one locality might not prove good in another. Whatever proves most satisfactory as a crop to be harvested in the ordinary way will, we think, make the best silage crop.

About one-half of our last summer's make was of mammoth sweet corn, and while it is not as sweet silage as we wish it was, yet it certainly is richer than that made from the B. & W. corn. We have not found it necessary to feed so much of it, nor so much grain with it as with the B. & W.

Figuring the weight at 40 pounds per cubic foot in the silo, we find that the B. & W. with us yielded 16 tons per acre and the sweet corn 12 tons.

We estimate that we have fed 10 per cent. more of the large than of the small kind and about 10 per cent. more of grain with it. And as the grain is the more expensive part of our ration we consider this something of an item.

We believe that it may be possible to harvest the remarkable yields, that have sometimes been reported, of 30 or 40 tons per acre by a system of thick planting and cutting while immature, but we do not consider it profitable. The question with us is not how many tons of green sour silage we can produce per acre upon which to expend our strength in harvesting, but how many tons of mature corn with plenty of well developed ears can be produced with just moisture enough remaining in it to produce the desired results.

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DISCUSSION.

QUESTION—I would like to ask Mr. Van Kirk what he covers his silo with?

MR. VAN KIRK—With green grass this year. The results were better than with anything else we have tried, although the grass was not as green as we like to have it.

J. S. JONES—Were the corners square or round?

MR. VAN KIRK—Ours are square, but I should prefer to have them round.

J. S. JONES—How would you round them in a house already built?

MR. VAN. KIRK—About the only thing that can be done is to bevel the edge of of a plank and nail it in the corner and fill in the space behind with sawdust or clay or something of that kind.

O. S. JONES—Would you build them above or in the ground?

MR. VAN KIRK—Above ground.

QUESTION—How do you fill them, rapidly or slowly?

WELDON VAN KIRK—Just as rapidly as possible.

J. S. JONES—After putting in ensilage slowly have you ever found out that it was moldy?

WELDON VAN KIRK—The first two years that we filled the silo we supposed it was imperatively necessary to fill it slowly, and in some instances we allowed it to remain three and even four days, until it reached a temperature of 125 degrees before putting in any more, and we did find mold on the surface to some extent; we have lately put it in just as fast as possible with better results. It

was more moldy in the corners than any other place.

G. C. HENDY—I would like to ask if a round silo wouldn't be better?

WELDON VAN KIRK—I think so; that is mere theory, however.

JAMES SPENSLEY—Wouldn't a stone silo do just as well under ground as entirely above ground?

WELDON VAN KIRK—Certainly, as far as the preservation of the ensilage is concerned, but you can elevate it into the silo cheaper than you can elevate it out.

JAMES SPENSLEY—Suppose it was on the hillside?

MR. VAN KIRK—Then that would be a good plan. The stone wall as far as it was banked on the outside by dirt wouldn't need to be protected in any other way, but wherever the stone wall had been exposed above ground there has been damage to the ensilage next to the wall.

G. C. HENDY—I would like to ask how you take out ensilage in using it without damage to it?

MR. VAN KIRK—We feed from the surface and we throw off a layer each day and we don't find it is damaged to any extent by being exposed for one or two days. We do not cover after removing a layer. We find when we commence feeding again that it is destroyed just as far down as the air penetrates it.

W. H. COLE—I would like to inquire if it is best to put partitions through the silo, provided it is of large capacity?

MR. VAN KIRK—That would depend entirely upon the depth. I recommend partitions in shallow silos that contain a large amount of ensilage, because you readily see a large surface would be exposed, and it is desirable to have just as small a surface as possible.

MR. RUNDEL — In an underground stable, could a silo be built say, in the upper part by the barn, and feed through a drive-way in the stable; if you had a silo built in the bank could you feed right out of the side of the silo, say, by having a door into the silo leading immediately into the gangway of the stable?

MR. VAN KIRK—I think that is a very good plan. Our silo is 24 feet deep with door from top to bottom, through which we pitch the ensilage.

O. S. JONES—What kind of material would you recommend a person to build a silo of, stone, brick or lumber?

MR. VAN KIRK—I stated in my paper that if one has the means, and wishes to build a most durable one, I would recommend a stone or brick silo, with a protection on the outside in some way, making a dead-air space, thus giving protection against frost. For the man who must build cheaply I would recommend the silo of lumber, two courses of boards, with tar paper between, which will give very good results as I can testify from experience.

T. J. VAN MATRE—I would like to ask if there is any advantage in siloing clover over the plan of cutting it and storing it for hay?

MR. VAN KIRK—There is, but we have got much to learn about clover, and it is well that this question was brought up. We put in clover last year in the silo and it made excellent ensilage; we put it in this year and it didn't keep so well. I think this was the cause of it: It is more difficult to exclude the air when a silo is filled with clover than it is when filled with cut corn. It doesn't pack so closely and to overcome that we will have to put the clover in a little greener in my estimation; say when it is in full bloom, then weight it a little heavier than we would corn and let it settle. One of the great advantages is

in being able to preserve our clover crop in a way we are not able to otherwise. Good clover hay is one of the best feeds, and poor clover hay is one of the worst.

H. C. THOM — Would you recommend running clover through a feed cutter?

MR. VAN KIRK — I don't. I should keep it spread evenly as it goes into the silo, so that the settling is the same all over. Don't pile it up at one end and have that weighted down and the other end way up. I try to keep it spread evenly and pack it on the sides and weight it pretty heavily after you get through.

W. H. COLE—Would you allow clover to wilt any after cutting?

MR. VAN KIRK—I shouldn't object to having it wilt from two to five hours; you would get that much wilting the best you could do.

MR. FLEMING—I will simply give you my experience. I have operated a silo for four years with good success. The first year I filled half of my silo with Southern corn, and the other half with another variety of corn. I was dissatisfied with the Southern corn, and what I saw then and have observed since, has led me to believe that the Southern varieties of corn have no business in my locality for the silo. My silo is constructed of wood at a cost of 70 cents per ton of storing capacity. I cut my corn as it is about to dent, passing from the milk stage to maturity, or when the lower leaves on the stalk show a brownish color. At that time I believe that all the food there is going to be in the plant is in it, and as I propose to use the whole plant I don't care whether it is centralized in the ear or distributed through the whole. I run it through a feed cutter and cut it into one-half inch strips. The past year I cut it a half and the year before I cut it a quarter. I think you can get a little more into the silo by cutting it fine. I have filled rapidly and have filled slowly, with no material difference in results. I have come to the conclusion, however, from my past experience, that the coming system for filling the silo is to fill it as quickly as possible, being careful, however, as to maturity of the corn. In order to maintain this maturity through the whole period of filling, I plant two varieties of corn; first, Yellow Flint, and second, the Yellow Dent. I fill from the Yellow Flint first and from the Yellow Dent afterwards, as there is little difference in maturity. In this way you are able to fill the silo with corn in very nearly the same stage of maturity. Cover the silo as quick as filled.

As your silo is filled the top portion of the ensilage will heat most quickly, not only from the heat which it itself generates but from the heat arising from below. I have covered my silo the last two years with wild grass, that has had considerable moisture in it. It was not cut until it was wanted to cover the silo. I put on about 12 inches of it, as much as there was room for in my silo, couldn't reach up into the gable, and I found it made a perfectly hermetical covering. There was positively no loss when I removed it; no weight was used more than that. I do not think hay would give the same results. It must be sufficiently wet in covering to follow the ensilage as it settles and to follow close to the wall. I found that the animals partook greedily of the hay with which the ensilage was covered. The doors are in sections from the ground to the top; we took out the top section and raked off the top evenly; we take off in the morning what we purpose to feed in the evening,

and what we purpose to feed in the morning we take off in the evening.

MR. GOODRICH—I will confine my remarks to just one point. I commenced to study the silo in the year 1876. I saw the first silo that was built west of the Allegheny mountains, and I saw the first ensilage taken out of it, the idea struck me then, How will that effect the butter? I asked that question for thirteen years before I could answer it. Every man that had a silo said it didn't hurt the milk, and every man that didn't have one said it spoiled it. But I found out as soon as my butter made from the ensilage began to get into the Chicago market, the commission men voluntarily wrote to me, and said: The flavor of your butter is splendid, and I was able to raise the price two cents a pound in a very short time. That satisfied me; that is what I am after; it makes no difference whether anybody that sits at my table can eat it or not. Now, there has been butter injured by feeding ensilage, there is no question about that. You feed damaged, rotten, bad-smelling ensilage, and you will get damaged, rotten milk. Some men have told me it didn't make any difference, but I have turned away from them, for they don't know anything about it. You feed good ensilage and it makes better flavored butter than can be made from dry feed. I not only know it, but the customers in Chicago know it, and that is the point I am after.

There is one other point as to the cost of a silo. Men are sometimes misled by being told that a silo can be built very cheap, for 15 or 20 or 60 cents a ton. He has not counted in his own work when he comes to tell you about that. One man told me it hadn't cost him anything but for the nails. He had the lumber in a tobacco shed that he took down and he did the work himself, and it didn't cost him anything. That cost just whatever was put into it. I built what they call a 200-ton silo, that is, there are about 8,000 cubic feet in it, but you can't get 200 tons into it by any ordinary human power, even if 40 cubic feet will make a ton; it has got to settle. It probably holds 160 tons. It cost me $240 to build it. I can give the items for all of it. The lumber bill was something like $175 at Ft. Atkinson. The $240, at 160 tons capacity, would make the cost $1.50 per ton. I might perhaps have built it a little cheaper, and I built it perhaps stronger than necessary.

SUPT. MORRISON—What size is it?

C. P. GOODRICH—It is 36 feet long by 17 feet wide, outside measure, and 16 feet deep; I have no partition in it.

L. H. ADAMS—Your silo is an outside silo, isn't it?

C. P. GOODRICH—Yes, it is built practically detached from the barn; that is the cost of the separate silo.

L. H. ADAMS—The cost that Mr. Van Kirk gave was for a silo in the barn.

T. L. HACKER—My experience with the silo has been for only three years. I had a barn in which there was an old bay; I took out the flooring and put up the joists, 2x10. The full height of the bay was about fifteen feet. The first year I put in B. & W. corn. I put it in a little too green. I cut it about half an inch in length and elevated it into the silo, but I did not, as was the custom at that time, weight it any. I simply leveled it off and threw on a little straw that I happened to have, to gather the moisture as it was evaporated. That ensilage was not satisfactory to me. It didn't give as good results as I had had the two years previous in cured corn fodder, which I had planted, the B. &

W. corn, and cut it as I fed it, into strips about half an inch in length. There was less loss in the manger with the fodder corn than with the ensilage, although there was not much loss with the ensilage. The ensilage was too sour. I attributed it to a lack of maturity. The next year I planted the Dent corn and the B. & W. corn. This time I cut it in two-inch lengths. The silo was filled half full of Dent corn, cut from the milk stage to the glazing stage, and then I filled up with the B. & W. corn, and for some reason or other there was considerable spoiled ensilage with the last; it was too sour to suit me, although my cattle seemed to like it and did very well on it.

The last lear it was Dent corn and I put it in whole; I let it get beyond the milk stage, and it was fairly glazed, and the kernels were like dough. I cut it with one of these sweep rake reapers and put it in whole and it has been a failure so far as being good ensilage is concerned.

SUPT. MORRISON—Wasn't it too dry, too mature?

T. L. HACKER—It heat up and actually dried out, there wasn't a particle of moisture in that silo from top to bottom.

QUESTION—What did you cover it with?

T. L. HACKER—I covered with green marsh grass; I put on about two feet of settled grass; there was room above the silo so I could pile it up, so I put in two feet of settled green grass.

QUESTION—How did you build that silo?

T. L. HACKER—I put on the inside good stock boards; then I covered it with black felt; and then I put good common stock boards over that; my bill I think was $53, not counting the labor of myself and hired men.

I was going to remark about the cured fodder that I have this year. Every bit of that corn has been eaten up, there hasn't been a particle waste, even the stalks. I haven't fed it to dairy cows but I have fed it to young stock and the other cattle that I was not milking, and they have certainly made very good use of it and have done very well on it; I have not fed the cattle a particle of grain this winter and they are looking well.

H. C. THOM—Two or three kinds of corn are not necessary to put in a silo. One is enough. The place for a silo is in the barn. The cost to me of building a silo that holds 250 tons, is $112.60. If you haven't anything else to cover with, cover with straw, run it through a machine and weight it. More damage is done to cattle by over-feeding silage than we suppose; 45 pounds is enough for a cow, and 50 pounds is enough for a two or three year old steer. Exclusive feeding of silage will taint the milk. The kind of corn to put in a silo, in my opinion, is the kind of corn which will produce the largest stalk that will get ripe. If we could raise a kind of corn that had no ears on it, it would answer the purpose of dairymen, I am sure, and I know it would those of beef producers. The function of a silo is to take the place of pasturage, which we get in summer, in the winter time. There is more danger of losing silage from putting it in too late than from any other one cause. It will dry from top to bottom if put in too late. If silage is put in too green it will inevitably turn sour, and we don't want it.

C. R. BEACH—I have used ensilage three years. I have used the Yellow Flint and Yankee corn planted with a horse planter, in hills twice as thick as I ordinarily plant Dent corn, about eigh-

teen inches apart. We cultivate it, hand-hoe the rows, and in this way raised 130 bushels to the acre this year. We cut it with a reaper and lay it off in bundles. We use two drays to pick it up, run it through a cutter which we run with a one horse power, and in that way four men put in an acre and a half a day. I feed it exclusively to cows. We cut it an inch and a half long. Mr. Adams was down there and said our corn would yield about fifteen or sixteen tons to the acre. We find no bad results from feeding it. We feed it in connection with bran, and hay, about forty pounds a day of it, with ten or twelve pounds of bran, and upon it the cows fresh in milk will give a pound of butter a day for 200 days. We like it and don't know how we could do without it. On a farm of seventy acres we have wintered for three winters forty cows. This year we shall have thirty tons of hay left over. Under this system we can harvest an acre of corn cheaper than by any other possible process. The corn is thoroughly digested, the cows like it and give large quantities of milk, the butter is good and everything satisfactory.

J. S. JONES—I have a silo 16 by 30 feet. I filled it this last season, and in taking out the ensilage I find a great deal of it got moldy in patches. In filling it I went according to the directions of some man who had built a silo. He said to keep the outside sloping; tramp the outside and never mind the middle. I did so, and in filling it I didn't pay any attention to the holes, until I straightened it out on the top, and then I tried to make it level, and I think that in most of the places the mold was the consequence of the ensilage not being kept solid in the center.

SUPT. MORRISON—Farmers never seem to think their own time is worth anything. I have an estimate here of the cost of putting ensilage in a silo, which estimate was given to me by Mr. Foster, deputy railroad commissioner; he had to hire it all done and consequently he had an account of it, and I think that you will be very much interested in it. It is as follows:

COST OF ENSILAGE.

*An Estimate of Raising, and Putting Into the Silo an Acre of Ensilage Corn.*

| | |
|---|---|
| Hauling out, and spreading, 20 loads of manure | $3 00 |
| Plowing, dragging, and seeding one acre | 3 00 |
| Cultivating one acre six times | 3 00 |
| Cutting up one acre of corn, and laying in piles, ready for hauling | 2 00 |
| Labor of two men, at the cutting machine. | 3 00 |
| For use of machine, and carrier, and power to run the carrier | 3 00 |
| Hauling one acre of corn to the silo | 3 00 |
| Total cost of raising, and putting into silo an acre of corn | $20 00 |

An acre farmed as here suggested, would produce 16 tons—making an average cost per ton—of ensilage $1.25.

| | |
|---|---|
| Six tons of this ensilage would furnish a cow 240 days, or 8 months, with a feed of 50 pounds per day. The cost would be | $ 7 50 |
| Ten pounds of hay per day—2,400 pounds, at $5.00 per ton | 6 00 |
| One ton of bran—for the 240 days | 10 00 |
| Pasturage for four months | 8 00 |
| Bran for the four months (one-half ton). | 5 00 |
| Total cost of keeping cow for one year | $36 50 |

That kind of feed should make 350 pounds of butter.

So you see at the end he is going to figure out a good margin. There you have the total cost of putting in an acre of ensilage corn and also the cost of keeping a cow a year by a business man.

H. C. THOM—There are two reasons why it will mold in the middle of the silo in patches. I think the main reason is because you put some corn in when it was wet on the outside.

J. S. JONES—No, sir, it was not; I think it was because it was dry on the outside.

H. C. THOM—Those are the two reason I was trying to get to; the one that it was too wet and the other that it was too dry.

SUPT. MORRISON —I would advise any contemplating building a silo to visit some man who has one and who has been successful with it. You will find lots of them all through the state, and if you go and visit them, then you can make up your mind whether to build a silo or not.

# SWINE SESSION.

## HOW TO BREED AND FATTEN SWINE.

By GEORGE WYLIE.

**No System.**

Many farmers go into swine raising without distinct or well defined plans as to the object to be finally attained. With them numbers is of the first importance, when in reality the point to be reached should be the greatest profit in the shortest time, which means the hog that can make the most pork on the least food.

It follows then, that the assimilative capacity of the swine fed, is of the first importance, and it goes without saying, that by proper selection and cultivation the assimilative capacity may be maintained or largely increased; but can also be lost in less than a single generation by careless feeding and improper management, no matter how high a point it may have reached.

Strong powers of assimilation are never found in swine that are lacking in constitutional vigor and substance. In breeding swine there is a point on the side of fineness and finish beyond which it is not profitable to go. A hog that at maturity cannot from the fineness of its breeding be made to weigh much over 300 pounds will not be a profitable feeder even up to six months of age. A hog that at maturity weighs 500 pounds with other things being equal will be a more profitable feeder when young.

There is such a thing as people being "governed too much," and it is possible for swine to be bred too far in certain directions to get the greatest amount of profit out of them. When hogs are bred for mere fancy points and finish, and constitution is lost sight of they soon cease to be profitable assimilators of food, notwithstanding the fact that they may have gilt-edged ancestry and themselves be on record in the respective herd book to which they belong. On the other hand there is a point on the side of coarseness beyond which the hog becomes a hard feeder.

**The Profitable Hog.**

Slab sided, coarse boned hogs that will not fatten under two years of age are not desirable, "but the general tendency of the times is more toward breeding too fine than too coarse" Coarse hogs can be improved in the direction of fineness easier than fine hogs can be brought up to coarseness. At a point between these two extremes can be found our profitable hog. I will not say that this point is midway between these two, as in my judgment the farmer or breeder is safer in finding that point a little nearer the side of coarseness than over the line toward fineness. "Once having a herd of swine with constitution, size, and bone, breed as near as possible to a profitable conformation;" the farmer will find no small amount of thought and study necessary to maintain them at that point; "when the herd

begins to show weakness at any particular point" the next infusion of fresh blood should be strong in that direction. But guard against sacrificing one point of merit to obtain another. Hold on to what excellence you may have with one hand while reaching out with the other to add more excellence to it. In the mere study of keeping the different profitable points of the animal well balanced the constitution and size is frequently lost sight of, and the herd sinks below the point of the greatest profit before the owner is aware of it.

### Infusion of New Blood.

Again, while the owner may be adding from time to time what he considers suficient bone and substance to maintain the herd at a profitable standard, if he feeds largely on corn he will find the general substance of the herd growing less and less, and instead of studying out the cause he is liable to conclude that this particular breed has become too fine for profit and he will try a cross or a mixture of something else. And with this resolution, qualities that have cost breeders years of patient work are cast aside and lost, for with the infusion of blood from another breed, the whole concern drops back to first conditions. When by a judicious infusion of new blood from the same breed and a change to food of a protein nature the herd in a short time might have been bred back from the danger line and placed on a profitable basis. I take it for granted that it is unnecessary to go into any argument as to the necessity of using pure bred sires of the breed that you propose to stand by. The beginner who expects to breed for pork only may start with such sows as he may have at hand, but he should fix a well defined type in his mind toward which to breed, and always make selections with that type in view. The nearer the stock approaches the typical representatives of the breed you are working with, the more difficult will the selection of the right kind of a sire become.

### Careful Feeding.

In order to obtain the best results all around, pigs should be taught to eat as early in life as possible. In some cases this will be when they are about two weeks of age. The time of teaching them to eat will vary. The size of the litter in some cases, and in others the amount of milk given by the dam, will govern it. Teaching them to eat is best accomplished by placing a small trough out of reach of the dam and supplying it with warm sweet skim milk and soaked corn. When the pigs have fairly got to eating be careful to increase the feed as gradually as the pig's power of assimilation increases. And right here care should be exercised in feeding the dam; avoid getting her "off" her feed. There is nothing so well adapted to make young pigs grow as their dam's milk, and while feeding the pigs liberally the sow should be fed all she will eat of the food best calculated to make her give large quantities of milk. Good shorts mixed with bran, or the shorts alone made into a slop and soaked between feeds, accompanied by a few ears of corn make a good milk-giving ration. The sow is first fed all the slop she will eat up clean, and then fed the corn. If you can follow the corn with a supply of skim milk, you will be getting nearer perfection. There are other combinations of feed equally as good as this, and if you can make an occasional change all the better. But when pigs are very young, sudden changes of food for the dam should be avoided, or if made must be made with care, as such

changes are liable to have an injurious effect on the pigs.

**Damaged Grain.**

Musty or mouldy corn, or in fact damaged grain of any kind should never be fed to a brood sow or her pigs. The right kind of feed, a sensible feeder, a good brood sow with a well-bred litter of pigs 6 to 10 weeks old, make a combination for the production of pork that is very near the highest possible limit of profit, a combination that will come as near keeping even with the big four, as any legislative enactment.

**A Well Balanced Ration.**

While pigs of this age are being rapidly grown, care must be exercised that they are receiving food of the proper kind to make bone and muscle sufficient to carry them. If fed too heavily on corn at this age they will get weak across the loins, the hind feet will draw up closely together and frequently the pig will be unable to rise without help. When you find one or two of your pigs in this way it is a danger signal and tells you plainly you are feeding too much corn, and a change to a ration containing more protein should be made at once. The object for the first four or five months should be to grow bone and muscle of sufficient strength to carry the fat put on by corn later on. It is understood, of course, that the brood sow and pigs are having the run of a good pasture of some kind. Clover will supply the most feed to the acre, but blue grass is good, and even young timothy is not to be despised. After the pig has reached five months of age the ration of corn can be increased, but not too heavily at first. If the profit is in the first 250 pounds, the quicker you can get your pig to that weight the better after getting on the corn ration.

**Hogology.**

Good feeding is regular feeding and giving the hogs all they will eat without losing their appetites. To do this successfully the feeder must study closely the capacity of the swine being fed. A feeder who leans over the fence, apparently in a brown study, while the hogs are eating, and then quietly throws over another shovelful of corn or pours in another pailful of slop, is getting better pay for his time than the feeder who, day after day, throws the same amount of feed at the hogs, but has no time to waste studying "hogology."

**Food of Support.**

The value of different foods, as demonstrated by chemical analysis, are not always borne out in practice. The digestive and assimilative capacity of the animal to which the food is fed cannot be determined by the chemist, and on these depend in a great measure the results obtained by feeding. Considerable more feed will be found necessary for the maintenance ration of 100 pounds of "shark" than 100 pounds of straight Poland China or Berkshire. The small pig that consumed a pailful of rich slop to the surprise and disgust of his owner, who when the pail was empty jammed the pig into it and swore that the pig didn't begin to fill the pail, was taking pretty near 100 per cent. of the food consumed for a maintenance ration. If you desire to know how much the food of support amounts to in a pig that you propose to sell at 200 pounds weight, we will suppose that he reaches that weight in 200 days. As he increases from nothing to 200 pounds then 100 pounds is his average weight for the entire time. And the amount of food per day that will hold him at 100 pounds without losing or gaining will be the



THE FAMILY DINNER PARTY. From Breeders' Gazette, Chicago, Ill.

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average food of support per day for the entire 200 days.

It is about time farmers were beginning to realize that greater profits are made from feeding young animals than from feeding old ones. That no one food is as good as a combination of foods. "That good blood will tell." That good common sense is just as essential to success in swine raising as in any other business.

## DISCUSSION.

MR. RUNDLE—What do you consider a satisfactory, cheap and practicable ration?

MR. WYLIE—Well, if you are running a dairy, and have lots of milk going to waste, milk would be as good as anything in that case. If you are not a dairyman, shorts will do as well; oats are one of the best feeds in the world.

JOHN MARCH—At what age would you prefer to have your sires for best service?

MR. WYLIE—Yearlings, two-year-olds, and three-year-olds.

JOHN MARCH—At what age or weight can you make pork the most profitable?

MR. WYLIE—Well, in a well-bred pig that is grown right and fed right there is no time in the pig's life that he will make any more pork than between eight weeks and three months of age, or perhaps up to four; it will vary in different individuals.

THOS. CONVEY—You mean if fed corn?

MR. WYLIE—Yes.

J. M. TRUE—For how long a time would you feed them corn to finish them for market?

MR. WYLIE—Well, as soon as you begin to feed corn largely, you want to get them to finish up as quickly as possible on the corn.

J. C. MARTIN—How many pounds of pork do you make from a bushel of corn?

MR. WYLIE—Well, that is a large question. The amount that may be made varies with different animals. We sometimes hear of 17 or 18 pounds being made, and other cases of 14 pounds per bushel, but I don't think the average amount made throughout Wisconsin today will exceed 8 pounds. In fact, I know more men that are producing pork at 6 pounds and less, than I do who are producing ten and twelve to the bushel.

J. C. MARTIN—To what do you attribute this?

MR. WYLIE—It is to a difference in the animals that are being fed; this represents the difference between good, well-bred hogs and hogs with no breeding at all.

MR. JOHNSON — In fattening hogs would you confine them in a close pen or let them run in a yard?

MR. WYLIE—I would never confine a pig in a close pen.

GEO. MCKERROW—Would you feed corn entirely at any time, even in the fattening period, to get the best results?

MR. WYLIE — No, sir, not exclusively although you can feed it more then. It is the cheapest food in the world, and they will probably stand more of it then than at any time.

SUPT. MORRISON—Do you advise cooking the feed for hogs?

MR. WYLIE — Not exclusively; it has been pretty thoroughly demonstrated that there is positive loss in feeding hogs exclusively on cooked food.

H. P. RUNDEL—Is there really any advantage in feeding cooked feed at all?

MR. WYLIE — Yes; you can feed three or four meals a week of cooked feed, or perhaps more, with beneficial results; pigs like a change, a variety in their feed, and it is mainly to supply that change that I feed cooked feed.

R. B. BROOKS—Do you feed roots?

MR. WYLIE—I do—mangel wurzel.

T. L. HACKER—At what time do you advise turning off a pig; at what weight?

MR. WYLIE—Well, it has been pretty well demonstrated that the largest profit has been in the first 200 or 250 pounds; when a pig gets up to that weight, if you can by any manner or means do so, turn him off and put the feed into another pig. Better let him go.

MR. HEARD — Have you ever tried peas?

MR. WYLIE—Yes, and they are a very fine feed. I think in this country they are better than corn.

T. L. HACKER — Do you thresh them and grind them?

MR. WYLIE — No, sir; I turn the pigs in and let them harvest them.

T. J. FLEMING — At what age would you change from a bone and muscle producing food to a fat producing one on pigs intended for pork?

MR. WYLIE—Four to five months' old.

JOHN MARCH—At what time of the year do you prefer to have your pigs come?

MR. WYLIE—Generally not before the 15th of April; there is a mistaken idea as to early pigs; a young pig is a very delicate animal; he needs warm air and sunshine, and you do not always have them in March and early April. Pigs that come when there is snow on the ground can't get out on the ground and they are kept in a small pen, and the result is they show their proclivities for fattening up and sleeping, and the first thing you know, when they are about four weeks old, they die with the thumps.

JOHN MARCH—Isn't there any cure for the thumps?

MR. WYLIE — The only cure is to put in plenty of dirt in the pen and make him take exercise; drive him around if you can't do any better.

JOHN MARCH—What is the profit of carrying pigs over winter for the early market?

MR. WYLIE—I have known lots of men to make money carrying over to September and August.

JOHN MARCH — Wouldn't skimmed milk be a valuable article of food during winter?

MR. WYLIE—I think it would. You are fighting aginst weather then; you have got that to contend with, and as pigs are generally wintered in Wisconsin they don't pay for the feed they consume. I believe it possible, though, to winter them at a profit.

C. I. BRIGHAM—At what age do you sell brood sows?

MR. WYLIE — I have kept them till eight years old. I think four years is old enough.

T. J. FLEMING—Isn't a September farrow pig the most profitable for a winter dairymen to keep?

MR. WYLIE—I am not a dairyman. If you have got milk it alters the case entirely; you can keep pigs profitably whenever you have milk, and if you can shelter them it is all right. A dairyman can generally keep turning off pigs every three or four months.

T. J. FLEMING—I want to make a point here, being a dairyman myself, that I think it is possible to keep just that kind of a pig, that is, a September farrow pig, instead of a full grown one. The point I think is worthy of consideration from a dairyman's standpoint.

MR. WYLIE—Well, there may be something in what you say from a dairyman's standpoint, but on general principles, from any other standpoint, I would say no. If I were a dairyman I would never feed my pigs whey.

C. P. GOODRICH—Don't you think a little milk in connection will add to the value of the corn?

MR. WYLIE—Yes; it not only adds to the value of the corn, but it increases the value of the milk.

C. P. GOODRICH—I will read the result of a test I made a few years ago. I had some pigs that averaged 125 pounds each. I divided them up to experiment with. Feeding corn alone, one bushel made ten pounds of gain; feeding milk alone, 100 pounds of skimmed milk made five pounds of gain; it made just half as much gain as a bushel of corn; and feeding separately a bushel of corn and 100 pounds of skimmed milk and they will make together fifteen pounds of gain; but when fed in connection it made eighteen pounds of gain, which made twelve pounds of gain for the corn and six for the milk. Fed separately with hogs at four cents per pound it made corn worth forty cents a bushel and milk twenty cents a hundred; fed together corn was worth forty-eight cents a bushel and milk twenty-four cents a hundred.

QUESTION—At what age should a pig be weaned?

GEO. WYLIE—I would say a pig should never be weaned. If you feed your pigs in a proper manner scarcely any of them will suck at ten weeks old.

SUPT. MORRISON—How do you feed these summer pigs?

GEO. WYLIE—I feed them all they will eat.

SUPT. MORRISON—In what way?

MR. WYLIE—I feed them shorts and skimmed milk and a certain amount of corn.

J. M. TRUE—Dry, hard corn?

MR. WYLIE—No, sir; soaked corn. People make a great mistake in feeding young pigs dry corn. Now, I don't want to claim that soaking the corn adds anything to it at all, but you feed a young pig dry, hard corn and you will very soon cloy that pig of that kind of feed, his teeth get sore and he will not eat; now if you soak the corn it makes it more easy of assimilation, and the pig is always anxious for it; the pig will never leave any soaked corn.

C. I. BRIGHAM—How long do you soak it?

MR. WYLIE—Usually not more than twenty-four hours. The quality of corn differs a little in regard to that; it should be soaked until soft, but not allowed to sour or anything of that kind.

WELDON VAN KIRK—Would you soak rye?

MR. WYLIE—I never feed soaked rye; I usually grind rye because it makes such splendid slop; rye is one of the feeds I think it best to grind for very young pigs.

W. H. COLE—Can you tell me how to pick out a hog with a good quality of bone, one that will carry the most pork?

MR. WYLIE—The general appearance of the animal indicates the quality of the bone a good deal; now, you don't want too coarse a bone, and you don't want a bone that is too soft and spongy; you want a good bone but you don't want too much of it, and you don't want too fine a bone.

JOHN MARCH—How do you judge of what may be termed the essentials of a good hog; just give us the essentials and the non-essentials?

MR. WYLIE—One of the first things to go by in a pig is his head; if he is lying down and I don't like his head I never stir him up; never look any further Whenever you find a pig that is narrow between the eyes and has a long, sharp nose, you always find a hog that is never satisfied with what you give it,

and it is always looking around the fence for a chance to get out.

MR. JOHNSON—You stated that breeding stock should be over one year old, from one to four; don't you think it possible to be successful with breeding stock less than one year old.

MR. WYLIE — Perhaps on the sire's side, yes; on the dam's side, no. The sow should be at least one year old when she has her first pig.

MR. JENNESS—Don't you think a hog should be slopped all the while?

MR. WYLIE—Yes, it should have a certain amount of slop.

MR. JENNESS — Well, do you think there would be profit in wintering shoats over, and clovering them, and slopping them?

MR. WYLIE — Yes; it would depend largely on the market, however, in regard to that. There is a point that farmers do not study closely enough, and that is the markets. If you will study the markets for the last twelve years, you will find that it has usually been better during the months of July and August than any other time of the year.

MR. SANDON—I would like to ask Mr. Wylie as to the relation of clover hay and raw potatoes in the winter, giving them three feeds a day and with slops. In the morning I would give them a ration of clover hay with slops, such as milk and house washing; at dinner I would give them a ration of oats, and at night I would give them their potatoes; is that a good ration?

MR. WYLIE — Well, I shouldn't call it the right kind of ration, but you can make the hogs live on that; it isn't a proper combination at all.

J. M. TRUE — What does it lack, Mr. Wylie?

MR. WYLIE — It lacks a little corn to begin with, and corn is the cheapest feed there is. If you are feeding in that way you would find this objection to that, you couldn't get them to eat very much of the clover hay, and there is too much of the potatoes.

MR. SANDON — I don't feed mine in that way, but I wanted to know if that was a good way.

MR. WYLIE—I have had the best results for a ration made up thus: One-third oats, one-third shorts, and a third corn.

C. I. BRIGHAM—How are the oats and corn fed; in what way?

MR. WYLIE—I never feed whole grain of any kind to hogs in a trough, because they bolt their feed. I feed the slops at noon, warm, and feed the corn at night.

J. M. TRUE—Couldn't there be a feed of potatoes given each day to advantage?

ANSWER — Yes, sir; in addition to this ration I feed my hogs three or four meals of mangel wurzels every week; I don't feed them, however, for any fattening qualities that they may possess, or anything of that kind, but to keep the system in good order.

T. J. FLEMING — Were those potatoes raw or cooked?

MR. WYLIE — I think it would pay if fed raw.

MR. SANDON — In the morning I give my hogs a ration of oats. At noon I give them their clover hay with their milk and slop and give a feed of bran and shorts mixed; at night I give them their potatoes and corn.

MR. WYLIE—That is a good ration.

T. J. FLEMING—Anything better than milk and corn for a hog?

MR. WYLIE — That is an awful good ration.

T. L. HACKER—I would like to inquire how you feed clover hay?

MR. WYLIE—I do not feed clover hay

to any alarming extent. I found that it was not very filling.

MR. SANDON—I first put the clover hay into a trough and then I take my shorts and feed and sprinkle over it before I pour my slops on top of it, and they eat it all and make a good ration out of it. My hay is cut very fine.

QUESTION—What breeds of hogs do you consider best for the average farmer?

MR. WYLIE—The breed that pans out the best.

J. C. MARTIN—What breed is that?

MR. WYLIE—I shall have to ask you to come up and see me.

# EXPERIMENTS IN PIG FEEDING.

By L. H. ADAMS.

MR. ADAMS—Whenever there is a hog discussion on there is a tendency to levity, but I don't know why it is. It seems to me that there is no animal that we keep on the farm that has done more to lift the mortgages that have weighted the farms down than our hogs. Not only that, but there are many valuable lessons in breeding that can be obtained from swine, without wasting a life to find out the points that you are after.

### Station Experiments.

Now we have been conducting some experiments as to the relative merits of corn meal versus other feeds, and I am going to give you some of our results. We are charged sometimes with being so intensely scientific that we can't come down to the practical on the farm. Now I have endeavored here to draw just as practical conclusions as it is possible to draw and yet keep on the safe side. On the farm we are often compelled to do not as we would like but as circumstances force us to do. It matters not how thoroughly we may be posted on the science of stock feeding, it sometimes becomes necessary for us to make

the most of feeds we have on hand, even at the risk of feeding an unbalanced ration. Therefore, I will confine my remarks to a few vital considerations that every farmer who raises hogs is obliged to contend with, and shall endeavor to show when and under what circumstances a feeder may or may not depart from a strict observance of scientific principles in feeding with a certain degree of safety and without incurring disastrous results.

### Corn to Pork.

In swine husbandry we have the great problem before us of how best to convert our great corn crop into pork, for that crop has not only formed the almost exclusive ration of our hogs in the past, but is bound to be so in the future, for there is no grain that we can raise with the same outlay that will bear any comparison with corn for the rapid building up of fat, and as we stand and look upon a bunch of broad backed, thick joweled hogs, we are inclined to regard with contempt the statement that corn is an unnatural or unhealthy diet.

### Constitution First.

But we should not forget that fat often covers a multitude of defects, and, I will add, that some of our horse breeders of today have no more—if as much—reason to forget this fact than the swine breeder has. It is life, energy, substance, great powers of endurance, and capacity for resisting disease; in short, constitution, that we want, more especially in the horse, but also, to a greater extent than we now have, in our great American hog. In the mad rush and scramble among breeders to develop ponderous frames, the truth should not be lost sight of that the scales do not tell the whole story, and that continued neglect of a few fundamental principles in breeding and feeding can only result in disaster in the long run.

### Breeding Animals.

It is very important, therefore, in swine husbandry, that the selection of breeding animals receive careful attention; only those possessing inherited vigor to start with; a rangy form, and strong limbs, that are calculated to hold up weight, should be chosen. When a sow has given evidence of possessing the desirable qualifications of a brood animal keep her. Don't make the mistake of breeding from immature stock.

### An Experiment.

After the selection of breeding stock has been made, the one idea that we should ever keep before us is, to encourage the development of bone and muscle rather than fat, by the use of such feeds as clover, peas, shorts, oats and dairy waste. Don't pave the way to failure in swine husbandry, by feeding corn to the brood sows, and then have to fuss and worry every spring with a lot of weak, puny pigs, that are predisposed to weakness and disease. And, in order to impress the truth and importance of what I have been saying upon your minds, I will relate the life history of a litter of pigs that we raised at the Experiment Station farm last year. The pigs, seven of them were born May 24th, and weighed 18¾ pounds the day they were born. The mother of the litter was a cross-bred Poland China and Berkshire, twenty months old at the time the pigs were born, this being her second litter of pigs. She was a strong, rugged animal, and a good mother. The pigs gained 302 pounds 5 ounces during the first seventy days with their mother, which shows conclusively that the litter was all right to start with. The sire of

these pigs was a full blooded Poland China, bred by, and purchased of, Mr. Geo. Wylie. The mother, while sucking the pigs, was confined in a large, roomy pen, with an earth floor, and she had constant access to a small outdoor yard. Her feed, and also that of the litter, when they got old enough to take an extra nourishment, consisted of corn-meal and skim-milk, in the proportion of three pounds of milk to one pound of corn-meal. The pigs were allowed to remain with their mother seventy days; they were then separated, and from that time on were destined to receive nothing but corn-meal. Here we have a litter of seven pigs, born right, and fed more rationally than the average farmer feeds his sows and litters, all thrifty and promising at the age of seventy days, and weighing 321 pounds. Now, mark the changes that take place during the following 140 days. For the first seven weeks after weaning, the litter was kept together, but fed entirely on corn-meal and water. Instead of going on and increasing the daily gain, as they ought to in proportion to the daily gain in capacity for taking and assimilating more food, we find it is just the reverse, for the seven pigs only gained 148 pounds during the seven weeks, or 6.9 ounces each, daily.

**A Corn Ration Only.**

At this time it was decided to select six of the most even pigs out of the litter, divide them into three lots of two each, and feed all of them on corn meal with what salt they wanted and rain water to drink, but to give one lot wood ashes and another lot ground bone meal, in addition to corn meal; the third lot was to receive nothing but corn meal and water. The purpose of the experiment was to feed them as long as they could bear up under that kind of a ration, and then kill them and study the effect of the feed upon the carcasses and viscera of the different lots. Thirteen weeks from the time the experiment commenced, the pigs that received nothing but corn meal had reached the limit of their power of endurance; it was with difficulty that they got to the trough; they were dwarfed in size, but excessively fat, and their appetites were failing daily. The pigs in the other two lots could undoubtedly have gone on a few weeks longer, by reason of the mineral matter they got from the ashes and bone meal, which, to a certain degree, supplied the elements of food lacking in corn, but so necessary to a healthy and symmetrical development of all farm animals. Fearing that one of the pigs, fed exclusively on corn meal, would die, it was thought best to kill them all at the same time in order that the different lots might be compared with one another.

**Results.**

After killing, the thigh bone, from the ham of each pig, was dissected and tested for its breaking strength. In the case of the pigs that received ground bone meal, it was found that the average pressure required to break the bones was 407 lbs. The bones of the pigs getting wood ashes snapped at a strain of 340 lbs.; the bones of the pigs that received nothing but corn meal gave out at a pressure of 306 lbs. After getting the breaking strength of the bone, they were burned by the chemist, in order to find how much mineral matter they contained. It was found that the bones of the pigs fed upon bone meal contained 109 grams of ash; the bones of those fed wood ashes had 99 grams, while the bones of those fed corn meal exclusively had but 89 grams. It will be seen at once that the strength of bone was just

about in proportion to the amount of mineral matter it contained. The odd pig that was left after the six had been selected for the experiment was turned out into the barn-yard with others, where it got a variety of feed; it went on, and developed into a fine, large animal. The only evidence he gave of having received too much corn at some stage of his life was a little soreness in the limbs; it was very evident that the bones were not strong enough to support the weight placed upon them. It is proper to add that all of the pigs on this experiment had an outdoor yard in which to exercise; the yard was floored, however, to prevent the pigs from geting anything other than what was weighed out to them. Now, think of it, starting with a thrifty, healthy litter of pigs at the age of seventy days, it only took twenty weeks of exclusive corn feeding to reduce those pigs to a condition of utter helplessness. For the last two or three weeks of the experiment, the pigs on corn meal alone did not gain anything at all.

#### Lessons Taught.

Now, it seems to me that this experiment demonstrates clearly the necessity of first getting our pigs well born; second, the importance of providing the pigs with a variety of muscle and bone forming food for the first three or four months of their lives, or until they have been enabled to store up enough mineral matter within their bodies to permit of a full and normal development of the bone and frame, while you are engaged in the forcing process with corn, and nothing but corn, in the middle or latter end of the pig's life. The first week of a pig's life is the most critical and trying period of its existence, as it is also the most important to the breeder, for if the pig at this tender age lacks strength and energy to assert and maintain its rights, it will soon be brushed aside and outstripped by its mates, and the loss thus caused can never again be made up. Unless a man is especially equiped for the raising of early March and April pigs, he had better not undertake it, for close confinement in a pen that is always more or less damp, and lack of exercise, will prove fatal conditions to many, and start others on a squealing career for their lives.

#### General Suggestion.

Have the pigs come the latter part of May or the first of June; and you will find that it is easier and cheaper to battle with the cold at the latter end of a pig's life, than it is at the first. Provide the sows in the fall with dry and comfortable quarters, where they will have constant access to the barnyard; they will then take care of any grain that might otherwise be wasted in the manure. In case the sows were in a yard where steers were being heavily fed with corn, the sows should be taken out for they would then get too much heating food, and that is not what they want. They should have a sufficient allowance of oats, shorts, roots, and such slops as the farm affords; fed sweet, and not in the highly fermented condition it sometimes is, to keep them in a thriving condition, not fat. In the spring turn the sows in a clover pasture, if possible, and sow a field of oats and peas, for the sows and litters later on. The sows should be accustomed to being yarded every night, and then, as farrowing time approaches, they will naturally resort to their pens, which should be provided with a narrow shelf or fender

around the inside of the walls, and 8 or 10 inches from the floor, to prevent the mother from lying on her young. A trough should be provided, where nothing but the litters can get to it, and if there is any skimmed milk to be had on the farm, it should be warmed to 90° or 95°, a little shorts or corn-meal stirred into it, and the pigs taught to drink just as soon as possible. As soon as I can get a pig to taking a little extra feed in this manner, I feel that I am well on the way to success. The feed should be increased as fast as the litters will take it, and the question of weaning them will settle itself without any interruption of their progress. And now with a strong, healthy, thriving pig to start with, we have got a shoat that we can force along on a field of peas, and top off with corn at any time during the following winter or spring without any ill effects resulting from the exclusive use of corn, and with profit to the feeder. Or, to state it in another way, the time to make preparation for a profitable hog is before he is born, for I firmly believe that there is more in the proper care and feeding of the sows, and having a pig that is born right, healthy, and thriving to start with, than any ration we can give them at the latter end of their lives, I care not whether it is balanced or unbalanced.

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## DISCUSSION.

W. H. COLE—Don't you think that you have set that a little too far down; don't you think the middle of April or the first of May would suit us better?

MR. ADAMS—If we could have them just exactly when we wanted them the first of May would be a very satisfactory time.

In regard to this question as to the quality of the bone, put to Mr. Wylie a few minutes ago, I wish to say that I think there is a great difference in the character of the bone. I do not think that a great big, rough bone is what we want. Now, in breaking the bones of these pigs I found that the largest were not always the strongest, but sometimes a bone would bend long before it would break; and seem very flexible.

SUPT. MORRISON—I should like to ask, after pigs have been confined to a corn diet for three months, if there is any use in feeding to make bone and muscle?

MR. ADAMS—It is possible that you can restore partially but never to their normal condition after a pig has been on corn for three months of his life.

J. H. WISE—Can a fatting hog be fed as profitably on corn meal exclusively as he can on that with something else with it?

MR. ADAMS—It is better with milk.

C. P. GOODRICH — How much corn will a hog of 150 pound weight consume in a day?

MR. ADAMS — From ten to twelve pounds a day.

H. ROBBINS—What will be the gain?

MR. ADAMS—Five to seven pounds of corn meal should make a pound of pork on a mature hog.

QUESTION—Do you mean a hog that has been fed all he can eat up to maturity?

MR. ADAMS—Yes, and then put upon corn meal and forced.

THOS. CONVEY—Do you advise feeding corn meal alone for fatting hogs?

MR. ADAMS—I do not.

GEO. WYLIE—You can't make a fat hog gain two pounds a day?

MR. ADAMS—I can a lean hog, a hog fed on nitrogenous foods, such as clover, shorts, etc., enough to keep him gaining.

GEO. WYLIE—At present prices would

you consider it profitable to grind feed?

MR. ADAMS—No, sir, I wouldn't grind feed for hogs; I would prefer shelled corn rather than to grind it.

QUESTION—Do you claim peas won't fatten hogs?

MR. ADAMS—They will, when you turn them in where they can get all they want in a soft succulent condition, but I don't know whether the pork will be of as high value.

T. L. HACKER—I am inclined to differ on that point. I think the nicest pork that can possibly be grown is from peas, oats and milk; I think it is equal to fowl.

MR. ADAMS—Mr. Hacker introduced two or three other feeds in connection with peas. My answer was in regard to peas alone.

T. J. VAN MATRE—I wish Mr. Adams would describe to us what he understands by a mature hog and when he would begin to feed corn to finish off?

SUPT. MORRISON—Maturity is an unfortunate phrase to use.

MR. ADAMS—That question of maturity will depend on the breeds, one breed will mature quicker than another.

J. M. TRUE—If you aimed to grow pigs to a weight of 250 pounds before selling them, at what stage of growth would you commence to ripen them for the market?

MR. ADAMS—I should aim to get pigs to the market at the age of from eight months to a year old. The most profitable feeding is done in that period, and if the pig is fed as I urge it should be the first three or four months of its existence, with the proper kind of food so as to get that frame to growing and developing properly, you can with corn then, along at the eighth to the tenth months of that pig's life, lay on a sufficient amount of fat to command the highest price in the market and have the most valuable pork.

GEO. WYLIE—Are you not mistaken as to the age? Isn't it rather under eight months than over eight months?

MR. ADAMS—A fifty pound pig will gain more with less feed than a hundred pound one, and it increases as it gets heavier.

J. M. TRUE—If a pig has reached a weight of 150 pounds, at say five months of age, without corn coming largely into its diet, at what time would you begin increasing the feed of corn, in order to have him mature at 250 pounds at about eight or nine months, as you have suggested?

MR. ADAMS—If you do not desire to market your hog until he weighs 250 pounds, you don't want to commence feeding corn when he is five or six months old; don't feed it to him heavily or exclusively until the last eight or nine weeks before you get ready to sell him. But let corn form an increasing ratio from five or six months up to within eight weeks of the time you want to let him go, and then make it all corn, if you will.

GEO. MCKERROW—How much should a good, well-bred pig gain every day from the time he is born until he is put on the market?

GEO. WYLIE—A pound a day is a very good gain.

GEO. MCKERROW — Then how old ought an average hog ought to be when he weighs 250 pounds?

GEO. WYLIE—Two hundred and fifty days, but you can do a great deal better than that.

GEO. MCKERROW—How much better?

GEO. WYLIE—I have had pigs weigh 200 pounds at six months.

SUPT. MORRISON—At what age can a pig be turned off most profitably?

GEO. WYLIE—I think at about seven months; twelve months is too long.

T. J. VAN MATRE—Isn't it a fact that in the Chicago market well matured hogs bring a larger price per pound than lighter hogs?

GEO. WYLIE—Sometimes it is and sometimes it is not, and it is as often in favor of the light hogs as in favor of the heavy ones.

ORANGE JUDD—You will find there is a class of nice shoats, 190 pounds and downwards that sell at the same prices as heavy weights; the highest price is paid for large shoats, 150 to 180 pounds, and then you strike up above 300, from 300 to 350; from 200 to 250 pounds do not sell as high.

G. C. HENDY—Many of us when fatting a hog for our own use would like to have them weigh 250 pounds, but we would like to have a little more lean meat?

L. H. ADAMS—You will have plenty of lean meat if you bring the hog up on dairy slops, clover, peas, and finish it off with corn.

THOS. CONVEY—Has exercise anything to do?

L. H. ADAMS—It has something to do with it in this respect, that you can't hope for a normal development without proper exercise.

T. L. HACKER—In preparing a hog for your own family use, why finish off with corn? Why not be satisfied with a nice lean piece of pork?

L. H. ADAMS—Because the highest quality of beef and the highest quality of pork is that in which the fat is all the way through it, marbled, as it is called; it is that that makes the juicy, palatable article so much desired, and a you can't put it there with anything but carbonaceous food, like corn.

T. L. HACKER—Now, I have just killed five young shoats, weighing probably 180 pounds each; they were raised on oats and peas ground and they were not finished off, but the pork is finished off; it is just the kind of pork we can eat with a good deal of relish. I think if I had finished off those pigs with corn they would have been too fat. I am not speaking of pigs for the market now, but for family use.

ORANGE JUDD—We used to fat a great many hogs; they were kept on clover in the summer, and mast, of which there was plenty, and then finished off on corn, and we had the pork, the lean and the fat.

T. L. HACKER—For the last three years I have sowed three bushels of peas and oats to the acre, half and half, and I have reaped them and thrashed them just the same as I do oats, and for dairy animals I have them ground; for pigs and young stock I feed them whole, and the result is exceedingly satisfactory. Every dairyman will admit that oats and ground corn is a first class feed but it is not equal to oats and peas.

W. H. COLE—How many bushels do you get to the acre?

T. L. HACKER—Last year I got forty bushels.

# HOW CAN WE MAKE PORK AT LOW COST.

By THOMAS CONVEY.

### The Best and Cheapest Ration.

If asked, which is the cheapest hog food we can produce? I would unhesitatingly say, clover. If asked, which is the best single food? I would answer, corn. But in the combination of these two foods lies the security of the pork producer. You may say this necessitates exclusive summer feeding, not necessarily clover hay, and clover ensilage, now forms part of a ration for hogs in many portions of the state and is giving the best of satisfaction, especially where fed to mature stock, kept for breeding purposes, and some parties reporting that they have kept brood sows on good clover hay each receiving two pounds of corn meal per day in addition to the hay the latter fed without preparation of any kind, while this style of feeding is practiced quite extensively in the eastern part of the state, and by the very best class of farmers. Yet I can not speak of it from experience, but consider it worthy of trial. But, I can speak from experience in feeding grain on clover pasture, and I prefer corn, and can honestly say, it is one of the best, if not the very best way to produce pork at a low cost, and it is somewhat strange so few farmers avail themselves of its advantages. At present prices pork can not be profitably produced on an all-grain ration, and yet it is equally true it can not be profitably produced on an all-grass ration, but the person who has never tried feeding a limited amount of grain to thrifty hogs on a good clover pasture would be surprised at the results. The practice of many feeders of feeding milk to hog ons grass in the absence of a grain ration, is not to be recommended, while young pigs do not derive much benefit from pastures except through the exercise and contact with the soil, and yet when the weather is suitable it is the safest place to keep them, as old pens with their unhealthy surroundings, and bad atmosphere, are particularly injurious to young pigs. Winter feeding should be avoided as much as possible, especially the practice of keeping what are termed store hogs, when not kept for breeding purposes.

### Early Pigs.

Early pigs, like early lambs and chickens afford the best chance for profitable feeding, they are capable of utilizing grain when it comes, and by liberal grain feeding, can be got in constitution to sell on the early fall market. The risk of losing winter pigs will prevent this practice from becoming general. Some feeders advocate having pigs come in the fall, carrying them over to the June and July markets. But the men who raise two litters a year from mature sows, claim this to be the way to produce pork at the least cost, also that they get the best prices. I have always preferred raising one litter a year, never weaning the pigs, but I have my doubts about its being the most profitable way.

### Not Corn Alone.

In recommending corn and clover I would not advise their exclusive use, as no food comes amiss with the hog, and his diet should consist of cheap rations,

when possible. But one thing should not be lost sight of, and that is he should make a reasonable amount of daily gain, for that represents the profit. And in the absence of it, there must be a daily loss, as the pig gains nothing by age if he does not increase in weight, on the contrary, he gets out of constitution, and this naturally interferes with profitable feeding thereafter. So the daily loss is not represented by the daily amount of food consumed.

Ignorance, or neglect of this principle is the source of more loss than anything else connected with feeding, and makes our meat products cost from 25 to 50 per cent. more than it should; without either pleasure or profit to any one, or anything concerned. The greatest possible daily income of weight, may not represent the greatest possible profit. We must consider the cost of a food as well as its nutritive value. Therefore, an all grain ration will not bear comparison with a mixed grain and grass ration.

Pork made in this way is at a minimum expenditure of labor, and there is the least possible loss of fertility, this, of course, refers to pasturing, and pork made in this way does not incur the extra expense of keeping up animal heat during cold weather.

#### Roots and Squash in Winter.

In fall or winter we should strive to supplement or supersede a grass ration with roots, potatoes, squash, pumpkins, cabbage, apples, or any of these. Some of them are better cooked and mixed with meal, they should be fed in connection with grain, and in cold weather less of this class of foods are needed, but they should never be entirely dispensed with, variety in food promotes digestion and improves the appetite, and the more an animal can assimilate, the greater the profits in feeding, but in feeding animals for meat production it it is just the same as in the production of the butter cow or the trotting horse. The animal having the greatest capacity to acomplish the object for which it is kept affords the greatest profit.

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### DISCUSSION.

MR. JENNINGS—Would you feed corn with your clover?

THOS. CONVEY—Yes; if I wanted them to produce the greatest growth I would feed about one-third the ration.

MR. JENNINGS—What if you should feed more?

THOS. CONVEY—Well, they would cost you more.

MR. WEST—I would like to ask Mr. Convey whether in feeding skimmed milk to pigs in the summer he has to warm it?

MR. CONVEY—It is better to warm it in the summer time for very young pigs.

L. H. ADAMS—What is a good gain on clover?

MR. CONVEY—I always strive to get one pound per day and usually get it. I have had as high as one and one-fifth pounds per day; if you work more on grass and less on corn of course you may gain something less than that.

J. M. TRUE—Have you had any experience in feeding peas to hogs?

MR. CONVEY—Yes, I have raised peas and oats, as Mr. Hacker states, and it is a very fine feed to balance up with corn. I think it is cheaper than bran and shorts. I produced this last year 46 bushels to the acre, and the year previous I produced 40 bushels to the acre. There is one objection to it, and that is that it will go down on rich land.

H. P. RUNDLE—I would like to ask if the peas and oats ripen at about the same time?

MR. CONVEY—Yes; I sow the late variety, but I believe any variety could be used. I drill them in with a drill. I sow the White Russian oats. I prefer the common field peas to the green peas.

T. L. HACKER—I was going to say that by sowing the oats I have no difficulty in the crop going down. I use the small pea. How do you cut the peas?

MR. CONVEY—With a binder and bind them up.

J. H. WISE—In what proportion do you mix them to sow?

MR. CONVEY—A bushel and a half of peas and a bushel of oats.

GEO. MCKERROW—Do you ever use charcoal in feeding hogs, and in what does its value consist?

MR. CONVEY—I feed charcoal and ashes to hogs in winter time, by leaving it where the hogs can get access to it without having it exposed to the weather.

W. H. COLE—Do you always keep salt where the hogs can get it?

MR. CONVEY—I don't feed it; they get it in the milk from the dairy.

QUESTION—Do you depend on corn to finish off with?

MR. CONVEY—I depend on a balanced ration; I find a balanced ration will produce the greatest amount of daily gain.

J. H. WISE—Have you ever tried to feed rye to hogs?

MR. CONVEY—But a very little; it is an excellent food but should be ground.

QUESTION—What use do you make of your pea straw?

MR. CONVEY—It goes in the oat straw and the cattle eat it equally as well; in fact it has more nutritive value than clover.

MR. JENNINGS—Have you ever fed ground barley?

MR. CONVEY—I have in connection with other feed.

R. B. BROOKS—In feeding my hogs last summer, having no corn, I fed shorts and part of the time bran; they were running on good clover pasture. Do you think it would be cheaper to buy corn?

MR. CONVEY—I think it would have been cheaper feed if they were running on clover.

QUESTION—How do you manage to thresh peas without splitting them?

MR. CONVEY—You don't need to run the cylinder close, and you won't split many of them; splitting them won't injure them for feeding.

JOHN MARCH—If they will take out the concave and put in a board the peas won't be split.

MR. CONVEY—You don't thresh oats in that way though?

SUPT. MORRISON—What do you think of the comparative value of a bushel of corn fed in June or July, with hogs on a good clover pasture, as compared with feeding a bushel of corn, with the temperature twenty degrees below zero, as farmers usually do?

MR. CONVEY—It is worth from three to five times as much.

GEO MCKERROW—At what age and at about what weight do you prefer to turn off hogs for the most profit?

MR. CONVEY—About six months old, and at a weight of from 200 to 250 pounds.

# PROFITABLE PORK MAKING.

By E. M. SNOW, Waterloo, Wis.

### Shiftless Management.

Several years ago having occasion to travel somewhat, my attention was called to the manner in which the hog industry was managed by farmers generally. It seemed to consist in allowing the young animals of any and all breeds to shirk for themselves until they were 16 or 18 months old, when they were enclosed in a pen from one to two rods square with ground for a floor; their shelter, if any, was a few poles laid across the corner of the pen, with a forkful of straw or hay placed on them which the first wind caused to disappear, and it was very seldom if ever replaced. The rains that came softened the floor until the mud was from six to ten inches deep, upon which corn was poured without stint. The soft feed was lifted over the fence and poured down among them, hoping that some portion of it might possibly reach the trough below, and he was regarded as an important factor in removing the mortgage upon the farm, and notwithstanding such rough treatment, he fulfilled the expectations remarkably well.

The time was, when the cow was wintered around a straw stack, receiving an occasional feed of hay, and water after the same manner, if convenient to the keeper; but later she was placed in quarters where the wind and frost were strangers, and the water she drank was warm to a degree of assimilation, and with this treatment she soon became one of the leading industries of the land.

### Better Care, Better Results.

It occurred to me, that if the hog had been cared for as the cow had been, why should we not reasonably expect as much better results from him. Acting upon this idea, I proceeded to build a pen, consisting of an alley four feet wide with feeding room on one side ten feet wide, and pens 6x12 feet wide on the other side, with a space 10x12 for the purpose of preparing food, which should be placed in the troughs while the feeding room was empty, after which the door is opened and the pigs enter at once, and all have an equal chance as there is an abundance of room. The side pens are used for temporary purposes only, as the stock is expected to sleep out side the pens in sheds prepared for that purpose. The sides of the alley is composed of swinging partitions, for the purpose of depositing food in the troughs and entrance to the pens. When we desire to handle our pigs we turn them into the alley and by having a board little less than four feet long and about three feet wide, we are able to sort out and handle them as we desire. We would like to have a lane from the feeding pen, 11 feet wide and long enough to accommodate as many one-half acre fields of clover as we have brood sows, so that each litter of pigs may be by themselves for two or three weeks, or until they are strong enough to protect themselves from robbery by those that are older; after which time two or three litters may be turned together according to the

capacity of the feeding pen. My method of feeding is to place the food in the troughs and then open a twelve foot gate around far enough to close up the lane leaving an open walk from the clover field to the pen; after they are done eating they are returned to the place from whence they were taken, the gate is closed, the process repeated until all have been fed.

This method of handling is very satisfactory, enabling the keeper to feed each pig what he desires him to have.

### Salt, Sulphur and Ashes.

I prepared a box about three feet each way, open on one side with an inclined board reaching from the top, to within three inches of the bottom, and the same distance from the backside with a cover on top, in which I keep a mixture of salt, sulphur and ashes. It is always dry and accessible to the hogs from the open side. But notwithstanding this precaution, I met with a strange experience. A few pigs seemed to be weak across the back as though they were strained, nearly losing the use of their hind parts, with a sunken appearance and loss of appetite as well. I selected two of the worst cases and put them in one of the small clover fields and prepared a powder of charcoal, sulphur, and salt, mixed with milk. The result was that they soon recovered from this attack, took their places in the herd and were all right. Whenever I discovered any of the above described symptoms, I mixed salt and ashes with the food, which I finally adopted as part of a necessary ration, after which time those symptoms disappeared entirely. Last year I raised and fed twenty high grade Polands which weighed 200 lbs. (alive) at six and one-half months old, two of which I continued to feed until they were eight months old, at which time they weighed 260 lbs. each. Their main food was shorts for the first few months after which, oats were added and pumpkins also, through their season, but all that time I fed just corn enough to make them as fat as I desired and no more.

### Clover, Corn and Pork.

Great care should be used that they they do not become too fat, for their growth. In 1884, I fed a bunch of fifty hogs which had been run on grass through the summer, until late in September, when I turned them into a field of clover, new seeding, about one foot high and nicely in blossom. The corn fed was fifteen ears each per day. The gain as to growth and fatness, was perfectly satisfactory, the meat was free from that oily softness that we sometimes find and seemed to be exactly what we wanted for home consumption. I have produced just as good results by cooking pumpkins to a pulp and thickening with corn meal, about one-half bushel of meal to one barrel of pumpkins, and would say here, that while we may give exact proportions of rations on general principles, the judgment of the master must determine for himself, from what he has in hand, what is best for his particular charge. If the hogs are increasing in size, without taking on a sufficient quantity of fat, the ration of corn is not sufficient and must be increased. On the other hand, if they take on fat too rapidly for their growth, the corn food must be diminished.

### Cleanliness Necessary.

I know of a lot of pigs that were wintered in one corner of a barn basement which was warm; their nests were cornstalks that were cleaned out of mangers, after being fed to stock, and this was nearly or quite the only lot of pigs that escaped the cholera scourge in that

neighborhood, thus showing how important it is that they should be kept dry, clean and warm. I have lost quite a large percentage of pigs, when I had the brood sows sleep on a plank floor through the winter, but since placing them in sheds, I have been fairly successful. I have never been able to satisfy myself why these things are so, but accept it as a fact, and govern myself accordingly. I have never had any trouble with mothers eating their young, except in one instance, she was enclosed in a small pen (6x10), in cold weather, fed with house slops and corn, and I could afterward see that something was lacking in the food she ate.

**Time of Farrowing.**

I would recommend the pigs to be dropped in May, while the mothers are on grass, at which time the weather is expected to be moderately warm and they are supplied with all the requirements of perfect health. The pigs should be fed for ten months, when they ought to weigh 300 pounds each and be ready for the March market which five out of twelve successive years the highest market price was paid and seven out of the said twelve years the highest market price was paid in September; but high feeding is not conisdered entirely safe in hot weather. The time was 1875 to and including 1886. I would breed from mature stock, retaining superior animals until their usefulness was ended, because I believe the pigs to be stronger and better able to resist disease.

**Selection.**

At the age of four months I selected a sow for breeding purposes from the lot of twenty mentioned above and placed her with two registered sows, all receiving the same care from that time on until seven months of age, when the grade weighed 150 pounds, while the registered ones weighed 200 pounds each. So I should try to get the best stock possible. A sow that rears pigs with bursts should be excluded from the breeding pen. When the farmers can with certainty produce the kind of pork as described above, I believe that the home consumption will be largely increased, because the intrinsic value is there and I think that should be the object sought for by every feeder in theland.

In the absence of milk, as with them in Nebraska, they must use flax seed, soaked in warm water until it jellies; this should be mixed with the food in sufficient quantity to produce a result which experience alone will show to be desirable. (It is just as good for colts.)

If ground oats are any cheaper than shorts, give them a fair trial. But I would not grind the corn but keep it for to balance the other feed. Mix the shorts or ground oats with warm water to the consistency of deep setting cream and add the jelly, or oil-cake meal in small quantities for three or four months, at the same time give them a clover run.

# DEERFOOT FARM PORK PRODUCTS.

By JAMES CHEESMAN, Southboro, Mass.

The starting of this farm was the purchase of a country home by Mr. Joseph Burnett. He is a native of Southboro and having been successful in business in Boston, desired to establish his summer home there, and accordingly purchased this farm. The farm was run as

**A City Man's Country Place,**

until 1871, when Mr. Edward Burnett graduated from Harvard and enlarged the scope of the farm operations, bringing it into prominence as a business enterprise. He was so successful in this that the word Deerfoot, as a trade mark for butter and pork products, is known over nearly the whole country, and the demand for them is more than the farm as such can supply.

The Deerfoot business is divided into three distinct departments or heads. First, the farming proper; second, the creamery or dairy business; and third, the pork business. Each of these is in charge of a competent foreman and all under the control of the office.

**Size of Farm.**

The farm comprises about 300 acres, a little less than one-half of which is under cultivation, raising hay and other fodder for the stock. The rest of the farm is rough, stony and in some places covered with undergrowth of sprouts. Some three or four acres per year are reclaimed and added to the arable portion of the farm.

The farm is situated at four corners of the town's highways, about a mile and a half west of Southboro station. On it are located the family residences of Mr. Joseph Burnett, Hon. Edward Burnett, Mr. Robert Burnett and Mrs. Gardner, several cottages for the employes, besides the barns and other

**Farm Buildings.**

The farm buildings are somewhat scattered as the business developed from small beginnings, and new buildings were added as was necessary. The barns are all serviceable and have nothing about them different from what any common barn may have.

The buildings are grouped together for ease of supervision and for the purpose of convenience in the use of power and system. The dairy is at the end nearest the foreground and the pork business at the other so that no unpleasant odors from the hogs can effect the butter. The boiler and steam engine is in the centre, with the office and laboratory over head.

**The Farm**

is devoted to making milk and raising pigs. The neat stock includes about 80 head of Jerseys, Guernseys and their grades. The herd is led by two A. J. C. C. bulls, one sired by Eurotas Victor Hugo 15,689, and having considerable Eurotas blood in his veins. The other, Hillsboro, was sired by Lord Darlington 7,285; in addition to having a considerable amount of Darlington blood, he is also descended from the Duke of Argyle and Morjoram families. The farm is now milking 53 cows, the balance being young animals. Everything about the barns is the ideal of neatness; the stables are continually sprinkled with plaster

and other absorbents. Much hay is cut, and this is a prominent article of feed, with corn meal, gluten meal and linseed meal.

Ensilage is being used now for the first season, a new silo 32x20 feet having been constructed during the last summer.

The number of pigs kept on the place varies, but it is intended to raise about 300 per year at the least, and we hope by greater economy in the waste products of the dairy to increase the number. The pigs are fed largely on the skimmed milk and butter milk from the dairy, and are also used to help in reclaiming the rough land. They are pastured on sections enclosed with movable fences, so that their runs can be readily changed. They are serviceable in turning over the soil, while adding to its fertility.

### The Pork Business

uses about 20 hogs per day. Such as are not raised at the farm are selected by its buyers from the best dairy districts in New England and shipped alive to Deerfoot farm for final feeding and butchering. The most prominent of the well known products of this department are the Deerfoot sausages, which are known the country over. But a large business is also done in fancy bacon, lard, and in small 15, 25 and 50 pound tubs of family pork. Pig's feet are put up in glass jars, and some of the sausages are put up in two-pound packages, and some of the sausage meat is also put in two-pound packages in parchment paper. This building is also equipped with machinery for doing work expeditiously, with rooms for butchering, cutting, making the sausages, filling and chilling, packing them, trying the lard, smoking the bacon, and everything else that is needed. Everything is neat and clean about the premises. The pork products are so well known and so popular that they are shipped all over the country, to Montana, New Orleans and St. Louis, Chicago, Cleveland, Cincinnati, Boston, Philadelphia, Baltimore and other places.

When the hog troubles appeared a few years ago it was deemed prudent to reduce the number raised on the farm to within a hundred and to exercise extra care in our selections to avoid suspicion of disease.

Since then we have not fed so many on the place, but have induced a greater number of farmers to make pork for us within ten miles of the farm. Our object is to induce those we buy milk from to take back their own skim at 5 cents per can of 18 pounds, or 27½ cents per 100 pounds, and compound this with equal weights of bran and corn meal, using not less than ten pounds daily of the milk and a suitable quantity of the mixture of the bran and corn meal to suit the growing demands of pigs.

Generally we have tried to follow the teachings of Dr. Goessmann's experiments by choosing the highly nitrogenous feeds for their high manurial values.

Dr. Goessmann's food valuation of fodder articles per ton:

| Fodder articles. | Market cost. | Manurial value. | Net cost. | Feeding value. | Cost per lb. Nitrogen. |
|---|---|---|---|---|---|
| | | | | | Cts. |
| Corn meal | 20.00 | 7.50 | 12.50 | 21.73 | 3.30 |
| Wheat bran | 17.00 | 14.50 | 2.50 | 22.92 | 2.21 |
| Wheat middlings | 20.00 | 10.75 | 9.25 | 22.82 | 2.73 |
| Gluten meal | 24.00 | 17.00 | 7.00 | 34.49 | 2.11 |
| Cotton-seed meal | 26.00 | 19.75 | 6.25 | 36.77 | 2.41 |
| Linseen meal O.P. | 27.00 | 21.75 | 5.25 | 37.99 | 2.50 |
| " " N.P. | 25.00 | 24.00 | 1.00 | 37.91 | 1.35 |
| Timothy | 12.00 | 5.50 | 6.50 | 12.06 | 2.18 |
| Corn stover | 5.00 | 4.80 | .20 | 14.30 | 4.95 |
| Sugar beets | 5.00 | 1.15 | 3.85 | 4.17 | 6.47 |
| Mangolds | 3.00 | 1.10 | 1.90 | 2.95 | 4.85 |
| Skim milk | 4.10 | 2.25 | 1.85 | 4.07 | 4.39 |

The above estimation of value is based on 4 1-3 cents per pound for digestible fat, digestible nitrogenous matter, 4 1-3 cents per pound, and non-nitrogenous 9-10 cents per pound.

This year we shall use a little Cleveland lindseed meal for pigs under 100 lbs. weight, after that we shall abandon linseed, leave out the bran when the pigs attain a weight of 150 pounds carrying them through to 200 to 210 lbs. On a mixture of skim milk and corn meal, and what they can pick up on their limited ranges on the rough land. We aim to produce lean meat by giving food of a close nutritive ratio, and free exercise on sheltered land. In summer we use movable pens rather than stationary buildings. In the fall we group the pigs together under the three barns where they have free range in lots of fifty to exercise on the long litter from the stable and the peat moss which we are now using in combination with plaster, as an absorbent. The gross cost of food and labor for one pound of pork with us at eastern prices of skim milk and grain figures from 5 to 5½ cents live weight. We estimate the profit of pork making on the value of the manurial residues of feed. This is one of the hardest lessons we have to teach the people who grow pork for us. They don't realize that corn meal is the most expensive thing we buy and that bran and linseed meal are the cheapest. If I tried in Wisconsin I should grow plenty of clover, barley and oat fodder and cut these up and mix them with corn ensilage, bran and skim-milk. Distance lends enchantment, and I suppose a paper from Deerfoot farm is considered by some, a little more spicy than some good hard headed pig-men in Wisconsin would offer. I want to swap. The New England States want to borrow the governor and Uncle Hiram Smith to teach us how to breed a business cow, and Prof. Henry and Theodore Lewis how to make healthy, sensible, nice eating pork.

The lesson we all have to learn is more faith in the few acres near our barns, to concentrate capital in fewer cows and pigs. To grind out less muscle on chores, do more thinking, use the scales every day, carry our pencils and note books all the time, and to know what every quart of grain costs, the cost of every bit of clover, corn, milk and pork raised on the farm.

Hoard, Morrison and Smith cannot save us if we do not learn our individual duty and do it. With such manhood and educational facilities to the square mile as you have in Wisconsin every farmer ought to be an expert in cows and pork. Make more bone and muscle for the pigs and you will always get enough lard. Never keep pigs longer than six to eight months old. Lean pigs, cleanliness and good faith have made our business and the same qualifications keep it together.

**The Dairy Department**

uses all the milk made upon the farm, and also such of the milk of the adjoining farms as comes up to the Deerfoot standard. The milk of 1,000 cows is used daily. The farm runs a car from Southboro to Boston every day, on which is sent much milk as well as cream, butter and pork products.

# HORSE SESSION.

## PRESENT AND PROSPECTIVE CONDITIONS OF THE HORSE MARKET.

By JOHN M. TRUE, Baraboo, Wis.

**The Best Will Always Sell.**

Few markets are uniformerly good.

Periods of general depression pass over the country during which all commodities suffer to a certain extent in their market value.

At other times dullness of market is noticeable with some given product, while others of a similar character even, are not affected. In the last mentioned case irregularities of prices may be almost always traced to the undesirable character of the commodity, or an overproduction, or oftener perhaps to a combination of these causes, since overproduction usually depresses the price of the poor product, without seriously affecting that of the better.

The farmer's market seems to be more at the mercy of circumstances than any other, partially on account of the varied character and quality of what he produces, and also from a failure or inability to make any studied observation of the law of supply and demand. Booms sweep over our agricultural interests, and we thoughtlessly rush from one enterprise to another regardless of the well established fact that such movements must lead to a reaction that will be fatal to the interests of many a bungling or thoughtless zealot.

**The Horse Product.**

For years no product of the farm has sold more readily, and at more uniform prices than horses. All kinds have had a market value. Good horses have sold high, while poor ones have paid well enough to encourage the scrub and low-grade producer to continue his work.

Horse breeding has had *its* boom, and colts are found in nearly every farm yard.

Of the entire horse product now in the hands of the Wisconsin farmer I estimate forty per cent. to be ostensibly roadster breeding, of an actual or prospective weight of less than 1,100 lbs., and of no special merit in style of movement; thirty per cent. of light or low grade draft-breeding, weighing actually or prospectively less than 1,300 lbs., and of draft and semi-draft formation and movement twenty per cent of draft breeding weighing, or to weigh upward of 1,300 lbs. and ten per cent of roadster breeding and possessing meritorious qualities of style, speed or sufficient size to make desirable carriage horses.

**Good Horses Pay.**

Horses are said to be low; indeed there is no sale for certain grades. It is safe to assume that 50 per cent. of our entire product represents this unsaleable class. I hear of no complaint of *no market*, or *low prices* from handlers of good roadster-bred carriage horses, or large, smooth, well-formed draft horses.

I have been criticised in the past, for placing so much stress upon size as a special consideration for the roadster breeding farmer. I have never wished, nor do I now desire, to divorce this quality from style and finish; but do believe that with this combination, little importance need be attached to speed. It makes little difference in value whether the horses trot in three minutes or four minutes, while the difference in price between 1,100 pound and 1,200 pound horses of equal style and finish is quite appreciable.

Increased weight also seems to be required by the draft horse market; 1,500 pounds being considered light enough for the big horse. But the market no longer pays a premium for flat feet, puffy or curby hocks and heads the size of a salt barrel. Indeed, it is getting quite sharp in its discriminations against these features that have been quite common with draft horses—quality is as desirable in a draft, as in a road horse.

### The Horse That Sells.

With 50 per cent. of our product unsaleable, upon our hands, shall we still breed horses? No! and Yes! We should not breed in a way to add to the non-marketable product. If through penuriousness, ignorance, or prejudice, we still insist upon perpetuating the little mongrel or the low-grade nondescript, if we breed at all, give up the work. There is no present or prospective market for you. But if you wish to raise horses as a *business*, can see the value of a dollar when well invested, as well as when in your fingers; like a good horse and know him when you see him, and are willing to admit that buyers who will pay long prices, and represent markets, know as well as you what is the best horse to raise—such men as you sell all their horses at satisfactory prices now, and always will find a good market.

### Intelligent Breeding.

I see nothing in the character of the present horse market that seems suggestive of radical changes in the future. We are no more going to return to the horses of twenty-five years ago, than we are to other styles and methods of those days. The American people do not progress that way. The coming trotter must fly, above 2:30 cuts no figure now. Not many of us will raise phenomenal trotters. Good roadsters and coachers weighing 1,200 pounds and upwards will be among the best paying live stock products of the next ten years, and intelligent, widea-wake horse-farmers can raise them. We shall always want lots of good draft horses, and the best paying type will never be lighter or poorer than the market standard of today. The draft horse is the product of good breeding and feeding. His production is within the reach of all farmers who understand these requirements; and the income from good work here will represent as much clear profit as for any other line of farm work.

### The Scrub Must Go.

Circumstances have conspired against the scrub, and he must go. Over-production has unmasked him, and without a buyer or friend he is plainly seen in his *undesirableness*. The farmer who raises horses for the market hereafter, will in common with his brother farmers who raise other products at a profit, find that he will succeed in proportion to the skill and intelligence he puts into his work. Competition will not soon be very sharp "up at the top," and the nearer he approaches that enviable position, the greater degree of success he may hope to attain.

# THE BREEDING OF DRAFT HORSES.

By ALEXANDER GALBRAITH, Janesville, Wis.

### An Important Industry.

Few departments of agricultural industry of this great country are more important than that of draft horse breeding, and none have been more uniformly profitable during recent years.

Croakers or prophets of evil, and also some of those interested in light horses, have sought to belittle the business, asserting that it was much overdone—that far too many heavy horses were being raised, and that a reaction was bound to set in.

Judging from the sayings of these wiseacres this reaction should now be long past due, and yet what do we find today? Why, the demand for first-class geldings or mares of suitable age, weighing from 1,400 pounds upwards, is still in excess of the supply, and the prices commanded by such horses have always been eminently satisfactory and profitable. Notwithstanding the general depression which prevails all over this continent, and the almost ruinous prices going for cattle, hogs and all kinds of grain and other farm products, it is a fact patent to all interested that good grade draft horses have maintained their value much better than anything else. In fact, they are about the only commodity on which the farmer is allowed to set his own price.

### Quality and Size.

The quality and size of the average draft horse in this country today compared with that of 10 to 15 years ago show a wonderful advancement—an advancement which may be considered phenomenal—and I think nobody will dispute that this improvement in draft horses has been a source of benefit and profit to the whole country.

It is doubtless true that in certain sections of the country there may be too many draft stallions, and consequently the terms of service are so reduced as to make the business unprofitable to the stallioneer, but after all this is an evil which ultimately rectifies itself. What is needed is a more thorcugh distribution and also better horses. There are yet many counties in some of the Middle and Western States, not excepting Wisconsin, where not a single pure bred draft stallion can be found, and others where the people are only beginning to recognize the necessity of raising heavy horses, and appreciate the benefits to be derived therefrom.

### Fewer Losses By Blemishes.

One great advantage which the draft horse breeder has over the breeder of road horses is that he has fewer sacrifices to make on account blemishes or imperfections. If a road horse or carriage horse has a deformity however slight, or happens to throw out a small curb or spavin or even a splint or gets cut on the barbed wire—or as friend McKinney used to call it, "That barbarous wire"—it invariably detracts greatly from his selling value. Not so with the draft horse—very little allowance having to be made for a small blemish on him. This enables the draft horse breeder to get a better average price on his sales. I don't wish to speak disparagingly of light horses—they occupy a very prominent and important part in

the horse breeding of America, but as an illustration of my argument I will suppose a farmer raises six trotting bred or roadster colts and the same number of draft colts annually. The first named, as everyone knows, require considerable more care and attention, and an extra expenditure of time and money in fitting them for the market. Out of the six colts raised he sells perhaps two of them for $200 each, other two for $150 each, and two, which in all probability are more or less blemished or inferior, bring $100 each. This, I think, is a very liberal estimate, and leaves an average price of $150 per head. I have not taken any account of the chance there always is of producing a fast trotter. While such chance always exists, and doubtless lends a fascination to the business, the experience of at least nine-tenths of breeders generally is disappointing, and it is scarcely worth while making any kind of reckoning where the chances are so extremely small.

**A Better Average.**

The six draft colts may reasonably be expected to bring an average of $200 each, or $50 per head more than the roadster colts, and if allowance is made for the early age at which they become marketable, the small expenditure necessary to fit them for the market (as they need very little breaking, and absolutely no training) and the greater immunity from blemishes of all kinds, I think that farmers and breeders generally will agree with me that there is a difference of at least $50 to $75 on each colt in favor of the draft horse. I do not mean to say that there is no profit in raising light horses. On the contrary I am satisfied that with the proper kind of mares, bred to good sized, well-rounded and well-bred trotting or coaching stallions the farmers can raise a class of colts that will yield him an excellent return and find a ready market at all times at good paying prices. In order to do so successfully, however, a greater amount of scientific knowledge of the art of mating and familiarity with blood lines is necessary, and above all things the mares must be especially adapted to the purpose, being themselves well bred, of good size, form, action and disposition and thoroughly sound. Of course such mares are not too plentiful and always command especially good prices.

**A Good Dam Necessary.**

This question of the dam proves a stumbling block in the path of progress made by the average breeder of all kinds of stock, and it should be borne in mind that no animal of any great excellence has been the produce of a poor mother. Farmers should as far as they possibly can sell off their worst stock, but retain their best brood mares and try to increase the number of them as opportunity offers. In breeding his mares the farmer should always patronize the best stallion within his reach. A few dollars extra for a colt is money well invested when you get the best there is in the market, and remember that the board bill of a scrub is as high as that of the thoroughbred.

**Pure-bred Stallions Pay.**

The Farmers' Review of Chicago, after a very exhaustive investigation of the subject published last year, arrived at the fact that throughout the middle and western states the average price paid the producer of grade draft horses, that is, horses sired by imported or pure-bred stallions was $167. The same report showed that the average price for horses got by grade and scrub sires was only $67. These figures are indisputable and ought to teach farmers generally a wholesome lesson, although I rather think it

is not necessary to apply the argument to the farmers of Rock county. The day has long since gone by for profitable breeding from anything short of the best sires that can be got, in any department of live stock.

Although it is my purpose to leave the discussion of this subject to others, I may anticipate one or two questions which may probably be asked.

### The Horse That Pays.

First—Is the high grade draft horse the ideal farmers' horse? Every farmer must reply from his own experience. Many doubtless consider him the best horse for general purposes in the world, while others might prefer a lighter and swifter moving horse for farm work, and for long distance traveling. I am of opinion that the ideal general purpose horse, or horse suited for all kinds of work, is something approaching an impossibility, and that time will show the folly of attempting to breed for such. Draft horses are not trotters nor buggy horses, and never can become such without spoiling their valuable draft properties, and so with road horses. To make them pull heavy loads simply unfits them for the special work for which they are adapted. So long as grade draft horses are suitable for farm work, command a ready sale at good, paying prices, and the demand more than equals the supply, it is surely wise policy for farmers to raise them, no matter what their individual tastes may be.

### The Best Will Always Pay.

Another important question which will naturally occur to men's minds is whether the present demand is likely to last, and what the prospects are for farmers selling to advantage the colts they are now raising. The best authorities agree that the number of horses used up and worn out on the streets of all the large cities is so enormous that, at the present rate of breeding, many years must elapse before the market can possibly become glutted with surplus stock, or that good draft horses will fail to bring a remunerative price. You will observe that I qualify that statement by saying good draft horses. There will always be a surplus of the poorer kinds on which there is no profit to the raiser nor credit to the handler of them, but if farmers will only stick to their best brood mares, or if they have no good ones try to get a few and breed them to the best draft stallion within their reach —if they do this consistently, and use ordinary judgment and care in this business, they can hardly fail to make a success of, and profit from, the breeding of draft horses.

# A WORD ABOUT COACH HORSES.

By A. O. FOX, Oregon, Wis.

### Horse Breeding.

The business of horse breeding in Wisconsin is in its formative period. Within ten years vast blocks of money have been invested in the business; until today the horses of our state are assessed for more money than all the cattle and sheep and hogs taken together.

The time has come when we no longer can afford to breed promiscuously; great deliberation must be had in the management of this vast property, if it is to mean a future continuous, financial success for the farmers of our state at large.

The problem of selection, is the one of all, which we must now study, and upon our comprehension of which, must depend our future success as breeders.

The bright sunshine of intelligent thought, must pour its grateful rays through the dense fog of our stable atmosphere. The day is gone forever, when the farmer can stoop to listen to the senseless harangue of the cross-roads "hoss-man," who, bloated with his own ignorance, pompously seek to extoll the qualities of his own stock, by malisciously running down the stock and character of his neighbor.

### The Breeder, Must Read and Study.

The farmer of today, who would be a breeder, must read and study, and know for himself the lines of breeding best adapted to his purpose, and to be able to discover at a glance, whether the horse is bred as he requires. He must be able to accept or reject upon his own judgment, and to know that the class of men who stay back in the old ruts and ridicule his choice, are themselves away short of the standard. Like the old mare of Bobby Burn's "they are relicts of the past, they're old has beens, they're a be dil'd wie the spavie in their heads.'

As a tribute to the memory of this abominable class of men, well may we join in the sentiment of Junius, in his celebrated letter to the Duke of Grafton, that "we owe it to the bounties of Providence that the deepest depravity of the heart is sometimes strangely united with great confusion of the intellect."

### Draft Horse vs. Trotter.

For the past twenty five years the American horse breeders have been bent upon the production of two extremes, the heavy weight draft horse and our most wonderful American horse product, the light weight, low-striding trotter. These both have their useful spheres, but in the mad and indiscriminate rush for their acquisition, there has been produced in the one extreme too many big, lifeless, flat-footed, soft-jointed bullocks, with legs full of coarse hair, of little utility and very short-lived; and in the other extreme we have too many short-necked, narrow-chested, nervous little trotters, whose ability to trot is only demonstrated after the expenditure of a snug little sum of money, and which, if they cannot trot, and trot fast, are of very little use to the farmer who had raised them, and must be kept at further expense, until they can be marketed as roadsters at about six years of age. I am well aware that I am on dangerous ground in thus expressing myself, but I

am certain that the majority of conservative breeders will endorse my statement, that the breeding of the typical trotting horse for profit, is a very hazardous business for the general farmer to embark in, *except he be unusually well posted in pedigrees and possessed of considerable spare capital, a cool head and unerring judgment.* (Bear in mind my exceptions.)

**Coaching Horses.**

Progressive breeders have begun to realize these two dilemmas and they are casting about for the material, with which to establish a class that shall combine to a great extent, the utility of both kinds, without some of their objectionable features; that will meet the popular demand for coaching horses, and that will at the same time perform their full share of farm labor from the time they are three or four years old, until sold off the farm.

In offering to the farmers anything digressing from the common draft horse, there is one important element which this horse must possess to a great degree in common with the draft horse, or he will not be acceptable, that is, early maturity. The farmer who lives in the great corn belt on lands worth from $40 to $75 per acre, cannot wait five or six years for his horse to reach a remunerative age, and pay taxes and interest on the investment. His horse must begin at three or four years of age to perform the labor of the farm; he must at that age have attained suficient size and substance to meet the wants of the general public. He should at four years old stand 16 to 16½ hands high and weigh in plain flesh 1,250 to 1,350 pounds. He should have a smooth, well-matured body; strong, clean limbs, with plenty of bone; and not a sign of coarse hair about the limbs or feet. The feet must be of the very best, for in this class of horses above all others, where fine knee and hock action is required, there must be a first-class set of feet to sustain it.

In producing this class of horses, where shall we find the best material? If it were not for the lack of the element of size and its early maturity, I should believe that we should find better results in careful selections among the largest families of the American standard trotting-bred horse than from any other source.

**The American Trotting-Bred Horse.**

We find among the American trotting-bred horses some with high class pedigress, that combine a strong standard inheritance with the further attributes of size, style and color with sufficient of the right sort of action; but upon inquiry about the individual we find his qualities not common to his family, and that he does not impart his size and style to his get.

There are a few instances where our best bred American trotting sires have been celebrated for their size and style of their get. Notably among these are Edwin Forrest 49, Mambrino Patchen 58, Harnson Chief 3841, and Indian Chief 832. The Kentucky Hylanders have also produced many fine carriage horses.

Undoubtedly among the get of these horses and their descendants are to be found as fine specimens of coachers as are attainable, but there are so few of of them that if all were put together, they would not equip more than two or three breeding establishments, and they are not, therefore, as a class, within the reach of most of our farmers. It is worthy of notice that in looking at the breeding of these named horses, we find a very strong impregnation of thoroughbred blood, especially on their dam's sides. This coupled with the fact that

the best coachers produced in Europe, are strongly of thoroughbred origin, may be of value to us in making our selections.

### The Dam.

The mares which we have within our reach to breed coachers from, are lacking more in size and bone than in any other quality. Trotting-bred mares can be found in nearly all sections with fair style and action, but they are too small and fine in the bone. It is fair to assume that in breeeing for coachers the majority of breeders will use this class of mares because they are the most common and easily obtained, and as a rule the graded draft mare will not be found to possess the ability to reproduce sufficient style and action. Few can afford to import or buy the imported mares. When they can be found there are no better mares for coach horse breeding, than our largest trotting bred mares, but they are scarce and are now held in such high esteem, that they are quite as high priced as the best imported mares.

### The Stallion.

In selecting our *sire*, therefore, for crossing upon these medium sized mares we must look sharply for plenty of size and an abundance of broad, clean bone. He must at 4 years old stand 16 to 16½ hands high, and weigh in plain flesh 1,300 to 1,450 pounds. His color must be clear and rich and without bad marks. His shoulders should slope gracefully back, and he should stand well up in the withers. He should carry a lengthy, well-arched neck surmounted by a cleanly-chiseled head free from meat. He should have a clear, full, expressive eye and the visage of a thoroughbred. His back should be of medium length, not too much inclined to arch, and coupled strong in the loins to a long, smooth hip. His tail should come out well up and float gracefully behind when in motion. He should have a good depth of girth, and a well sprung barrel. His limbs and feet should be absolutely sound, not too long between the joints and not too straight in the hind legs, that he may have his feet well under him, and an easy, graceful hock action. His action should be high, bold and square, and with sufficient speed to roll off from eight to twelve miles an hour with ease and grace. His disposition should be spirited and intelligent.

### The American Trotter.

If, in making this selection, we can find a predominance of these qualities, in a high-bred American trotter, with the *ability* to *reproduce* them, I believe we have the best to be had.

If, on the other hand, we are to look abroad, among the European breeds of coachers for our sire, we must keep clear of the thick-chopped, meaty-hocked, drafty sort, and look sharp for high quality with purity of action. Many of the imported horses offered us are very unevenly balanced in their action and are not level. They may lift themselves square in front, and appear well when approaching, but when once their hind end is turned there is noticed a lifeless swinging of the hind parts entirely out of keeping with their forward action; in others with hock action almost to the extent of stringhalts we see a stiff bending of the knee, and bad dishing in front. In many the tails set on too low in the rump, a very bad fault in a carriage horse.

### The French Coacher.

Among the several breeds of imported coach horses offered us, I believe the French coacher to be the best adapted

to our needs. He matures very early into a large horse, and while possessing wonderful substance and bone, he still has preserved the high finish of his thoroughbred ancestors, and his action when in motion is the most perfect and most evenly balanced of any of the imported breeds.

The question as to whether the French coacher will reproduce himself on our mares, cannot yet be said to have been fully demonstrated; but it is rapidly reaching that point. Many who have been making this cross for the past several years are highly pleased, and careful observers who have been watching the results, are now beginning to put their money into it, in a manner which shows their convictions.

**A Bone and Muscle Ration.**

But whatever sire we use, I believe there is still another important element, the full recognition of which is essential to our success; namely, the kind of feed with which to mature our colts, so as to assist in the development of a large active horse with clean, strong bone, and well muscled throughout. If we may hope to avoid the meaty, lifeless, soft-jointed, round boned sort; if we may expect to develop the bones and muscles of our horses to the greatest strength and soundness, we must see to it that our colt's food is of the bone and muscle-forming sort.

The recent experiment made in hog feeding by our Prof. Henry, of Wisconsin, by which he shows the wonderful effect of nitrogenous foods upon the strength and quality of the bones, and the amount of muscular tissues, is a timely admonition to the western farmers, that if we wish to grow valuable horses, it must be done with less corn, and more of such foods as will give a uniform and even development, that at four years old will produce a strong sound, whole horse.

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# CAN THE WISCONSIN FARMER PROFITABLY BREED ROADSTER HORSES?

By JOHN L. MITCHELL, President of State Agricultural Society.

If Mr. Morrison had consulted me about the soundness of a certain horse, my opinion would have had weight, because I deal daily with horse infirmities. A moot point in pedigree, also would have found me fairly well informed. But the economic question—"Can the Wisconsin farmer profitably breed roadsters?"—I am at a loss to answer with authority.

**Recreation Exercise and Profit.**

Horse raising and horse driving have been for me a matter of recreation, exercise and health and not of pecuniary profit. I have never overhauled my horse accounts for fear that the balance would be on the wrong side and thereby mar the pleasures of the pursuit. Mr. Morrison's query, however, has led me to a little horse introspection. If not tedious I will give some figures. During the last three years I have sold for cash (no trades nor ballooned prices), 18

head of trotting bred animals, as follows: Four aged mares at total of $2,700; 4 four-year-olds, at $4,750; 1 three-year-old at $1,750; 3 two-year-olds at $1,350; 4 yearlings at $740, and two weanlings at $1,100, making, the all told, $12,390, an average of $688 per head. Eight of these animals were purchases which, on trial, I thought it advisable to dispose of. The remaining ten were of my own breeding. The average age of these last, at the time they were sold, was 1½ years and they brought an average of $424 per head. With the exception of an aged mare and 3 four-year-olds they had never worn harness. They were sold on their pedigree and individual promise solely.

On their face such prices look profitable. On the expense side, I find that I paid $850 in stud fees for these ten animals. I carry thirty head of horses, more or less. They cost me in board and wages for the men, in oats, hay and straw, shoeing, harness, in round numbers $3,000, or $100 per head per year. Then there is interest on a hundred acres of land used for pasturage; interest on money invested in stock and buildings. After figuring this all up I find that my colts at 1½ years stand me in $300 apiece, leaving $124 to the good. Something should be donated for death, disabling accidents and veterination in brood mares. Allowing for this, I still find myself ahead in the breeding venture, with all the fun, fresh air and the pleasures of hope thrown in.

### Roadsters at a Profit.

With me, extravagant sums have been paid for brood stock, little attention has been paid to economy in management and no especial effort has been made to advance sales, or obtain high prices. Having this in view, I am convinced that the farmer of Wisconsin can raise roadsters at a profit. But to do so, he must give the business close personal attention—neglect and preventable accidents soon ruin the business. Above all must he have a liking for the pursuit, a natural gift in that direction.

Wisconsin winters are longer than in more southernly states, where horses can be pastured to advantage. But to counter balance this we have cheaper feed and a more healthful air. The neighboring state of Michigan is situated very much as we are in the matter of climate and market. Should Mr. Morrison ask a Michigan farmer the question which he has put to me, he would be answered in the affirmative, without hesitation. The production of trotting horses is a great industry in Michigan—one that pays handsomely.

It is true, buyers do not flock to Wisconsin as they do to Kentucky, with over-fat purses in search of would-be world-beaters. Still, we have a steady remunerative market for sound, enduring, speedy roadsters. The supply is far from being up to the demand.

### Richard Richards.

That a Wisconsin farmer can raise roadsters profitably has been demonstrated by the late Richard Richards, of Racine. He settled in that county, at an early day. He had little, or no capital. His horse beginning was small. His foundation of stock cost him hundreds where others expended thousands. But he was a genius in his way. Through the breeding of trotters he accumulated a snug fortune and achieved a national reputation. His methods are instructive. To mate with the common run of mares, he started with a horse called Bellfounder—a horse of size, finish and action, to Messenger and Ziomed. To breed to Bellfounder's daughters he went to Kentucky and

bought Swigert, by Alexander's Norman, dam by Mambrino Chief. Swigert proved to be a remarkably successful sire. He has been of great value to this state and the whole northwest. To put the finishing touch, Mr. Richards purchased an inbred Hambletonian, Alden Goldsmith. In blood lines, Mr. Richards did not follow the fashion—he kept a little ahead of it. He was prophetic. But he was never blinded by a pedigree. He insisted upon having a horse as well. Him he selected with unerring eyes.

**The Purse-Winner—A Will o' the Wisp.**

While I am confident that on the cheap and fertile lands of Wisconsin and in its salubrious climate, roadsters can be raised profitably, I do not advise the farmer to try his hand at producing the track trotter. He will waste his midnight oil in dog-earring the 2:30 list. The purse-winner is a will o' the wisp which he will capture only in his dreams. There is not one in a hundred of the standard-bred trotters that shows enough natural speed to warrant the costly experiment of track development, of those that do, not one in a hundred ever earns his oats in actual races. The prices paid for the Axtells and the Sunols are dazzling, the thousand of failures are lost in obscurity.

The Wisconsin farmer need not face the financial result of the breeding of fine horses, providing he applies himself faithfully to the business. The horse breeder's calling is a high one. Let him bring to it not only his intelligence, but his conscience. The handiwork of the manufacturer perishes and leaves no trace behind. But the horse breeder builds for all time. Let him therefore, devote himself to the creation of a type of horses possessing beauty, action, soundness and good sense, so that to the remotest generation, they may carry their owners with pleasure and safety to the end of the road.

SUPT. MORRISON — The title of the next paper is, "Wasteful Management of Farms and Lazy Acres, the Cause of Hard Times in Farming."

This paper was prepared by Hon. Hiram Smith, who had hoped until recently to be present, but on account of illness is prevented.

More to Regent Smith than any other man are the farmers of Wisconsin indebted, not only for the Experiment Station and its efficient work, but also the Farmers' Institute. Months before an institute had been held, they were patiently outlined by him and with confidence in the intelligence and enterprise of our farmers, he felt that they would be successful, and from the richness and fullness of his experience he has always been willing to give the best he had to advance the agricultural interests of the state. Mr. H. C. Thom will read the paper.

H. C. THOM—It will probably never be my lot to again stand as the representative of a man who has a reputation such as Hiram Smith has earned in Wisconsin, and it does me much honor to even read a paper that he has prepared.

# WASTEFUL MANAGEMENT OF FARMS AND LAZY ACRES, THE CAUSE OF HARD TIMES IN FARMING.

By HON. HIRAM SMITH, Sheboygan Falls, Wis.

### Leaks and Wastes.

Mismanagement in dairy farming and unproductive acres, is the procuring cause of most of the wide-spread depression now so loudly complained of, by the great majority of dairymen in this and other localities. The annual waste of fodder on the large majority of farms is often equal to the amount utilized. Mr. Horace E. Stockbridge, director of the Experiment Station of the state of Indiana, says in Bulletin No. 29, that "careful inquiry and observation extending over the entire state, forces the inevitable conclusion that as much nutriment in the form of fodder is wasted every year as actually finds its way into the digestive systems of the farm animals of the state." Let us pause and consider for a moment the deep significance of this statement if it is true. It is very easy for the careless and unthinking farmer to dispose of the unwelcome charge, by saying I don't believe it is true, but the careful and observing dairyman has no question of its entire truth, many intelligent dairymen know from their own bitter experience that the statement is a very mild one.

### Criticise Thyself.

Many farmers are very ready to ask questions of others and this is all right, but real progress begins when we ask questions of ourselves, when a man begins to talk to himself in earnest, made more earnest, when total receipts from the farm, are less than the legitimate expenses of the family, a man in this condition is not apt to have much nonsense in his questions, or answers. The man says to himself, I have eighty acres of land and I have never been able to keep more than fifteen cows, and these cows average about $30 per head, total receipts $450, and I have to pay one hired man eight months, his wages and board cost not loss than $150, leaving but $300 to pay taxes, farm machinery, repairs and board and clothe the family. I tell you, that my wife and I work more hours and for less wages than any miners or operatives that ever struck for higher wages. Again this man says to himself, I have this farm, and have always worked at farming and don't know any other business, what shall I do? The capital I have invested in the farm don't bring me in anything. I don't even get good wages for my work, and nothing for the hard work of my wife, not even good clothes, no recreation and but little reading matter for the family, I know it is hard and the question for me is: Is this condition of things a positive necessity? I know that some farmers keep more cows than I do, they keep double the number on the same number of acres, and I have heard that some dairymen keep forty cows on eighty acres, but I don't believe that, but if I could only keep twenty-five cows, it would bring in $400 more than I now get and that would want only one more milker, and my wife really needs a good hired girl,

and that would make all the milkers we would want.

**Success and Courage.**

The man begins to take courage, and says to himself $300.00 a year more and only the expense of a hired girl, and we ought to have the girl any way, if we could afford it, now the main question is how can I manage to raise fodder for ten cows more? It is the fodder I want, because the skim milk or whey from twenty-five cows will make pork enough to buy the bran or oil meal I ought to have. Now I have read or heard somewhere, that this large fodder corn will produce fifteen, twenty, thirty and sometimes forty tons to the acre. Now I don't believe a word about thirty and forty tons to the acre, but perhaps I can raise twelve tons. It is said by many dairymen that a cow will eat about fifty pounds of green corn or ensilage per day, so I see by this that an acre of corn fodder if it only produces nine tons will winter two cows, and if it will produce thirteen and one-half tons per acre it will winter three cows. Now I have made up my mind in talking to myself that I will send off and get a sack of sweet corn, two and a half bushels, and that will plant ten acres. I will try it any way. The relation of this imaginary case may seem to some a trivial affair, but it is the true history of hundreds of progressive dairymen throughout the country, it is the most important step the man has ever taken in his farm life, and becomes a memory in after years, as the turning point from penury to prosperity.

**On the Up-Grade.**

Now mark his subsequent history if he is a resolute man. He planted the ten acres of fodder corn, and in anticipation of the possible sucess of his new departure, he raises ten heifer calves, the corn proves a large crop; and by the first of January he finds he can sell $200.00 worth of hay and still have plenty of fodder; with the $200.00 from the sale of hay, he buys five cows, so that he is milking twenty cows the first year after conversion to improved methods of farming. The second year his ten heifers are in milk and he is milking thirty head, and he plants twenty acres of corn, and plows up ten acres of his old pasture, and sows to winter rye, clover and millet for soiling, when pasture is short, thereby keeping up the flow of milk so that his thirty cows average a production of forty-five dollars each, raising the total receipts of the farm to $1,350.

**A Brighter Picture.**

This is a true history of hundreds of dairymen in the state, who have had the sense to change the old methods of pasture grass for summer, and mainly hay for winter. What is the conclusion of the whole matter? It is this, in place of nothing as net receipts under the old method, he now has $350.00 at least, his land is growing more and more productive, his cows are grading up to larger production, he has raised his wife from a mere drudge, to her rightful prerogative, a well dressed, good looking, agreeable companion, he has kept one more boy and girl on the farm, he is more self reliant, more independent, a bigger and better man. Is there a man present that ever knew a man that raised good fodder crops, carefully preserved them and fed them to his own stock without waste, that was a poor man? One thing the timid or inexperienced dairyman should not forget. That if the skim milk or whey from fifteen cows, will raise calves or pork enough to buy the bran and oil meal for fifteen cows, then any increased number of cows, thirty, fifty or one hundred will do the same thing, cultivating and enriching lazy acres, and the cultivation preservation and final utilization of the fodder crops, is the keynote to successful farming.

# BEEF SESSION.

SUPT. MORRISON—This is probably the last opportunity I shall have this winter of saying a word in justification of the Farmers' Institutes. I find that there are many farmers scattered through every county who seem to be prejudiced against the Institutes. Why, bless your hearts; it is the development of your special vocation. Every farmer in the state should be proud of this awakening, and if it does not come up to their ideas of Institute work, if it does not deal with the practical questions that confront them every day upon the farm, they are the very ones that ought to take hold and make it what it should be. It seems to me a man has not got to have much forecast to look into the future and see that unless a work of this kind is fostered and encouraged, the farmer is going to be nothing but a laborer and in time nothing but a serf and peasant. If the farmers of Wisconsin do not themselves wish to elevate their business and vocation, the business men and professional men certainly will not help them to do so. I have been upon a farm nearly all the days of my life, and all the hope and pride I have is in the farm, and I would like to see the farmers of the state of Wisconsin think so much of their business and become so well posted in it that they would be proud of it, proud to say that they are farmers, and throw into it all the efforts, all the study, all the attention possible, and then it is going to rise right along with them.

I want you to remember there is no politics in a farmers' institute, any more than in a Sabbath school. They are intended to train the farmers of the state in such a way that they will be able to stand upon their feet and express their views in reference to farming matters, and just the moment they become men endowed with thought they become God-like, and then they will avail themselves of the privileges and rights that belong to them. Consequently I don't want the farmers of the state to throw stones at the work, but take hold of it and make it what it should be, and when we come to have a thousand institutes scattered over Wisconsin, and perhaps a dozen or more in this county, and the farmers come together and pool their experience, then farming will become a profession and we will be proud that we are farmers.

The first topic that we will introduce is not on the programme, but will be presented by Mr. J. M. Smith, President of the State Horticultural Society. He is going to tell you how he produced 1,736 bushels of potatoes on four acres of ground.

J. M. SMITH—Before I read my paper I wish to say a word in endorsement of what our friend Morrison has said. We all of us know what he is and know the work that he has been doing, and sometimes when I read in some of my agricultural papers how the farmers are oppressed it makes me tired; it makes me sick and out of patience. Whose fault but our own is it that we are dumb. We don't understand our business. We

don't do what we might do; we don't do what we ought to do; we don't do what we can do; and these institutes are for the purpose of making us helpful to one another, and the man who writes or talks against them, it seems to me, is hurting himself a great deal more than he is hurting anybody else. If we only work together we can make our lands worth a great deal more by learning the value of our land. There is no man knows the value of his own land. I don't believe there is an owner of a ten-acre piece of land in Wisconsin that knows the actual value or worth or possibilities of his land, the worth that can be brought out of those acres for himself, and for his family and for his friends. And that is what the institutes are for, to teach us to work them better and to make more out of them for ourselves.

# POTATO EXPERIENCE.

By J. M. SMITH, Pres. of Wis. State Horticultural Society.

**How He Produced 1,736 Bushels From Four Acres at a Profit of $355.77.**

For a good many years past my crops of potatoes have, as a rule, been very good. For a number of years I have been very anxious to test the different kinds of potato fertilizers that have been advertised at the east, and see how they compared with those I have used for these many years on my own place. Last spring, when the American Agriculturist offered its own and the manufacturers' premiums for the best acre of potatoes, I concluded to make the long desired trial and watch the results. Selecting four acres of land suitable for the purpose, for convenience's sake, I designated them plats No. 1, No. 2, No. 3 and No. 4. They lay side by side. Soil is as nearly uniform a nature as can be found, and is a dark, sandy loam, with yellow, sandy subsoil. It was originally a fairly good soil and has been manured heavily every year for a number of years past. It has also had numerous crops taken from it. Each plat was measured off and staked and marked by our county surveyor. The four plats were all treated exactly alike, with the exception of the fertilizers.

**Systematic Work.**

A strict and careful account was kept on the different dates at which the work was done, and of the expenses of the work. They are as follows: April 23—the land was in first-rate condition to work, and we commenced plowing it about eight inches deep, and finished April 26. The land was all thoroughly surface-drained and most of it thoroughly under-drained. Commenced harrowing April 26 and finished April 29. After the land was plowed, and before any harrowing was done it was manured as follows: Plat No. 1 had twenty loads of composted manure spread upon it. The loads contained about half a cord each. Plat No. 2 had eighty bushels, heaping measure, of unleached wood ashes. No. 3 had 1,500 pounds of the Bowker perfect potato fertilizer spread upon it.

Plat No. 4 had 1,500 pounds of the Mapes potato fertilizer. All was thoroughly harrowed in.

### The Kind to Plant.

Now came the very important question of what variety should be planted. In competing for a premium, will it be best to select some of those tremendous growers and yielders, but which are not in reality merchantable, some of them in fact of no value except for feed to stock, and not much there, or in preference some good and salable variety, and try to obtain a large yield of fine and merchantale potatoes? I chose the latter course, and planted the entire four acres with the Early Ohio. The land was marked off in rows thirty inches apart, and the potatoes were planted in drills, one piece in a place, about twelve inches apart. The seed had been cut to from one to two eyes, except at the seed ends, where there were sometines three or four eyes upon a piece. The seed was of my own growing. I have for some ten to twelve years been selecting the finest specimens of this variety for planting, with excellent results, and did not vary my practice in this case.

### Amount of Seed.

Commenced planting May 1 and finished May 4. The potatoes were weighed after being cut, and the average was 10 bushels 1 pound per acre. About the same amount of seed was used upon each acre, and was planted about three inches deep. May 27 the potatoes began to show sprouts through the ground, and they were well harrowed. June 15 the potatoes were cultivated and hoed. June 25 they were cultivated and hoed. In both cases the hoeing consisted in merely destroying the weeds in the rows, that could not be killed with the cultivator. The above is all the cultivation they received. It was intended to go through them once more, but very soon after the second cultivation a shower came, accompanied by a severe wind, which spread the tops over the ground so completely that I feared doing more harm than good by any further cultivation, and they received no more.

### Level Cultivation.

The last time they were cultivated the shovel was put on the cultivator, and a very slight furrow, possibly two inches deep, was made between the rows. Except that, there was no hilling done, and in this case no earth was thrown against the plants, and only a very little thrown towards them. June 25 poisoned the Colorado beetles with Paris green and water, using but a teaspoonful of the poison to one ten-quart pail full of water. July 5 to 12 poisoned them again. July 25 found a few more beetles and poisoned them. The above concludes the labor of growing the crop. We commenced digging the potatoes Sept. 9 and finished Sept. 16.

### Cost of Crop.

| | |
|---|---|
| Plowing the four acres | $7 80 |
| Harrowing | 4 00 |
| Forty bushels Early Ohio potatoes | 20 00 |
| Cutting the same | 6 50 |
| Planting | 10 00 |
| Paid surveyor | 1 00 |
| Cultivating and hoeing | 13 25 |
| Opening drains after rain | 2 00 |
| Paris green | 5 00 |
| Putting on the same | 9 87 |
| Digging, picking up, heaping and covering up the potatoes | 60 00 |
| Total | $138 92 |

This includes the cost of the crop with the exception of the manures, and amounts to $34.73 per acre. Now let us add the cost of the fertilizers:

### Cost of Fertilizers.

| | |
|---|---|
| Plat No. 1, 20 loads of compost manure at $1.25 per load | $25 00 |

| | |
|---|---|
| Cost of cultivation | 34 73 |
| Total cost of the acre | $59 73 |
| Plat No. 2, 80 bushels of unbleached ashes. | $7 00 |
| Cost of cultivation | 34 73 |
| Total | $41 73 |
| Plat No. 3, fertilized with 1,500 pounds of Bowker potato fertilizer | $30 00 |
| Cost of cultivation | 34 73 |
| Total | $64 73 |
| Plat No. 4, received 1,500 pounds of the Mapes's potato fertilizer | $30 00 |
| Cost of cultivation | 34 73 |
| Total | $64 73 |
| Cost of the crop as they lay in covered heaps | $230 92 |

You will probably think this a pretty heavy expense to incur in growing potatoes, viz., an average of $57.73 per acre, but we will now see about the receipts:

### Receipts of Crop.

| | |
|---|---|
| Plat No. 1 yielded 334 bushels of merchantable potatoes, worth 35 cents per bushel, and 21 bushels small ones, worth 10 cents per bushel | $136 59 |
| Total cost | 59 73 |
| Leaving a balance of | $76 86 |
| Plat No. 2 yielded 434 bushels merchantable and 21 bushels small potatoes, total, 455 bushels (same price) | $154 00 |
| Deduct cost | 41 73 |
| Balance | $112 27 |
| Plat No. 3 yielded 432 bushels merchantable and 22 bushels small ones, total 454 bushels (same price) | $153 40 |
| Deduct cost | 64 73 |
| Balance | $88 67 |
| Plat No. 4 yielded 402 bushels merchantable potatoes and 20 small ones, total 422 bushels (same price) | $142 70 |
| Deduct cost | 64 73 |
| Balance | $ 77 97 |
| Balance on plat No. 3 | 88 67 |
| Balance on plat No. 2 | 112 27 |
| Balance on plat No. 1 | 76 86 |
| Balance over all expenses | $355 77 |

Total yield, 1,736 bushels.

I have for the sake of brevity thrown out the fractions of bushels, but the aggregate varies only ten pounds from the exact weight, as weighed out and sworn to by upright and disinterested men, who had charge of digging, picking up and weighing the entire crop. The price given is a little less than that actually received, and all are sold except 200 bushels that I had saved for seed. They were large and smooth, even in size, and in every way desirable for the market, and there was no trouble in getting a few cents per bushel more for them than the regular market price.

### The Best Will Pay.

Now what are the lessons to be learned from the above statement? The average yield of potatoes in the Northwestern states does not exceed 100 bushels per acre, and in the Southern states is much less than that; but it will be readily seen that if I had received only 100 bushels per acre I should have run heavily in debt. Two hundred bushels per acre would have paid expenses, interest on land and taxes; though it would have left very little, if anything, for profit. But with over 400 bushels of beautiful merchantable potatoes per acre that would, and did bring more than the market price, the balance upon the right side is certainly a nice one. The season was hardly an ordinary one. It was very wet for a time, the latter part of May and early in June, and after that it was very dry. Some of the potatoes were seriously injured by the dry weather. Those that were fertilized with ashes stood the dry weather best, and as it has been seen, yielded a little the most of any, and gave by far the largest profit of any of the fertilizers used.

### Save the Fertilizers.

At least, one of the lessons should be to

save every bushel of ashes that can be made, and then buy all that are to be had at a reasonable price. Some of your readers may say: "Our land is not rich enough for such crops, and we cannot make it so without bankrupting ourselves." Now, fellow cultivators, please listen for a moment. Five years ago last spring I purchased a large part of the land upon which this crop of potatoes was grown. It was new land, and covered with stumps and brush.

#### Thorough Preparation.

We dug out both stumps and brush so completely that one good team of horses plowed the entire piece without once striking a root or stump that held them up. We planted the piece with potatoes. The season was a fair one, but we harvested less than 100 bushels of merchantable potatoes per acre. Five years later we harvested over 400 bushels per acre of much better ones. There are millions of acres of land in these Northwestern states that are capable of growing just as large crops as here reported. They will not do it next season, because the soil is not at present sufficiently fertilized, neither is it in first-rate condition, but, my friends, you can begin to put it in better condition next season, and keep on improving it year after year until it will yield as large crops as have been reported either here or elsewhere. In short, to me it is only a repetition of the old, old story.

#### Poor Crops Will Not Pay.

Moderate and indifferent crops do not pay and cannot be made to pay. They have not paid for a number of years past and I can see no prospect of their paying any better in years to come. Very large crops have paid in the past. They will pay yet. They promise to pay in the future. Then let us all, instead of constantly trying to increase our number of acres increase the yields per acre, and, by so doing, I firmly believe we shall make more money, have more comfortable homes and be of more service both to our neighbors and to our country.

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#### DISCUSSION.

SUPT. MORRISON—How was it possible for you to receive that price for potatoes, when potato growers at Waupaca were receiving only 20 cents for potatoes?

MR. SMITH—I thought it possible that I might sell them for seed potatoes, and having a large acquaintance as I did all over the country, I wrote to a number of seed men throughout the United States, and among others to Peter Henderson; a gentleman who saw my letter to Peter Henderson and saw the offer I made to him, wrote to me as soon as he saw the letter and said to me, I will take a car load at the price you offered to Mr. Henderson, and I sent him a carload, and a carload to a commission firm in New York city; I told them the potatoes were perfect, that they couldn't find any potatoes but what were just what I represented them to be, perfectly sound, pure and good in every way, and they brought me considerably over 35 cents; they brought me seven cents above the market price simply because they were extra nice.

SUPT. MORRISON—The point I wish to make for the report is that it is one thing to raise a big crop and another thing to market it.

J. C. MARTIN—Do you regard that as a reliable market that you put those potatoes on, or is it a sort of special market? Is it on account of your reputation as a horticulturist or on account of

merit in your goods that you can secure these good prices?

MR. SMITH — My reputation would amount to very little if I sent a poor article on the market. I study up the markets of the country and if there is a deficiency in any part of the country I find it out: I find out the rates of freight; I find out some good reliable dealers there in that line; if I don't know them I find out who they are; and whether they are in Kansas or in New York or New Orleans or somewhere else, and I don't know why farmers generally can't do the same thing.

J. C. MARTIN—You dodge the middle man?

MR. SMITH.—Yes, I get just as near to the consumer as I can.

WELDON VAN KIRK—How do you get the reliable dealer?

MR. SMITH - One way is to go to Bradstreet's, and if I don't know any other way I go to the reports and find out some man dealing in such or such a business, and write to them, but generally I know somebody, somewhere in that neighborhood that I can write to and say, "Hunt up some good reliable man and let me know about them," but if I don't know of any one there, I go to Bradstreet's.

C. R. BEACH—Do you use leached ashes or unleached.

MR. SMITH—Unleached.

QUESTION—The gentleman stated in his paper that a rain storm came prior to the time that he intended to cultivate the potatoes last, so that he could not cultivate them, on account of spreading the tops. I would like to ask if you think the cultivation, if you had got it performed before the storm, would have done those potatoes any harm, or would have done them good in the aggregate of the crop?

MR. SMITH—I can't answer that; I intended to have gone over them for the sake of stirring up the ground a little more and keeping it a little looser; I don't know whether it would have added to the crop or not.

QUESTION—I would like to ask the variety of the crop?

MR. SMITH—Early Ohio.

THOS. CONVEY—What importance do you attach to the use of good seed?

MR. SMITH—A great deal of importance.

JAMES JACKSON—Do you bank your potatoes?

MR. SMITH—No, sir; they were not hilled.

JAMES JACKSON—Do you believe in open cultivation, or would you have hilled those potatoes, provided the weather had been proper?

MR. SMITH—I would not have hilled them.

JAMES JACKSON—I have found that the pototoes I hilled were far superior to the ones I didn't hill. Of course I used none of the fertilizers; only the barn-yard manure.

MR. SMITH — How deep do you plant them?

JAMES JACKSON—I believe about three inches under the surface.

MR. SMITH — How deep was the land plowed?

JAMES JACKSON—Probably eight inches deep.

MR. SMITH—What kind of soil is it?

JAMES JACKSON—Clay sub-soil.

MR. SMITH — I find that the largest crop that I have ever known of was grown by flat cultivation. This was not quite flat; we put on the shovel the last time through them and made the furrow two or three inches deep, and threw the earth toward the potatoes, but no earth went to the tops, so it left the ground a

little sloping toward the potatoes and a heavo rain would have run in toward them.

A. O. HINMAN — How far apart were the rows?

MR. SMITH — They were thirty inches apart and the pieces about twelve inches apart in the row.

C. I. BRIGHAM — Might not hilling be of advantage in a wet season?

MR. SMITH—I think it would in a dry season, particularly if not thoroughly drained; my land was thorougly drained.

JAMES JACKSON — Isn't hilling of advantage in a dry season; doesn't it help to hold the moisture in?

MR. SMITH—No, I don't think so.

JAMES JACKSON—Doesn't the constant cultivating of the soil in a dry season tend to hold the moisture more than letting the soil lie still?

MR. SMITH—Yes, it does a great deal more; you can almost get clear of any ordinary drouth by constant cultivation.

JAMES JACKSON—In those potatoes of ours, those that we didn't hoe, there were some weeds that came among them, more than in the potatoes hoed by hand; now was that the cultivation that made the extra crop, the extra hoeing, or was it the weeds that made the poor potatoes?

MR. SMITH—Very likely both; I don't believe in weeds?

H. P. RUNDLE—Are you troubled with potato bugs, and if so what is your remedy?

MR. SMITH—Yes, we are troubled with potato bugs; we go over them with Paris green and water; put in about half a tablespoonful of Paris green to a pailful of water and put it in a sprinkling pot and just sprinkle them over; we can destroy them very readily in that way.

H. ROBBINS — Would you use land plaster if you couldn't get the ashes?

MR. SMITH — I have not used plaster on my land for many years.

A. O. FOX—I would like to ask if you have ever found that Paris green sometimes injures the plants?

MR. SMITH—It will injure and destroy any plant if you make the water too strong of it; I made my first use of it a good many years ago, and I killed everything I put it on to; potatoes will bear it stronger than most any other plant that I have ever used it upon.

J. M. TRUE—I am anxious to know, Mr. Smith, whether you think that wood ashes would be found equally beneficial upon all kinds of soil? For instance upon the black loam soil like the one described by Mr. Jackson?

MR. SMITH—I don't know about that; with me it is a remarkable fertilizer; we consider it better with potatoes than any compost heap manure, which we consider the best manure. Besides, nothing that I have ever used or seen used is equal to ashes as a protection in time of drouth.

J. M. TRUE—And isn't it a fact that moisture is especially necessary?

MR. SMITH—Yes, sir.

C. P. GOODRICH—I wish to get some information about the time to dig potatoes. Now, these early potatoes planted early will ripen early, the last of August or first of September, now if you want to keep those potatoes over, what time would you dig them, as soon as they ripen or leave them in the ground?

MR. SMITH—I would dig them as soon as they were thoroughly ripe.

C. P. GOODRICH—How would you take care of them in the warm weather?

MR. SMITH—Put them in heaps of anywhere from 25 to 30 or 40 bushels on top of the ground, and cover them over

with a little straw, and then a couple of inches of earth, just enough to keep the rain out, and leave an opening in the top to let the moist air out, or for ventilation, leave them there until the ground begins to freeze in the late fall, and then put them in the cellar, and in that manner I have never failed keep them nicely.

R. D. SEELEY—Do you reject the small potatoes in preparing for market?

MR. SMITH—Yes, sir; throw out the small potatoes.

R. D. SEELEY — Do you approve of planting small potatoes.

MR. SMITH—No, sir.

R. D. SEELEY—What disposition do you make of your small potatoes?

MR. SMITH—Boil them up and feed to the hogs mixed with other things.

R. D. SEELEY—Are you satisfied that the small potatoes don't produce as large potatoes when used as seed?

MR. SMITH—I think you wouldn't notice the effect in a year but the inevitable effect would be to ultimately ruin the crop.

JAMES JACKSON—In answer to Mr. True's question as to the ashes as a fertilizer on our soil I would state that I have been hauling ashes for a number of years on to this piece of land where we had these potatoes. We had about a fourth of an acre of potatoes and we raised probably about 80 or 90 bushels, which I considered quite a crop, from a fourth of an acre, and I attributed the success to the use of the ashes as a fertilizer largely, of course I used some stable manure besides. In regard to potato bugs I would state that we have a zinc white establishment at Mineral Point close to our place, and I got some of the zinc white to kill the potato beetle, and it killed them effectually, and I believe it was a very good fertilizer for the potato also.

J. S. JONES—What do you mean, Mr. Smith, by the ground being underdrained?

MR. SMITH— It was under-drained with tile.

J. D. JONES—I would like to know how you would apply commercial fertilizers to potatoes?

MR. SMITH—By putting them on the top of the ground after plowing and harrow them in; all fertilizers are put on in the same manner and harrowed in after plowing.

GEO. MCKERROW—I would like to ask Mr. Smith if he thinks it advisable to plant whole seed, and do you get better results from it?

MR. SMITH—The experiments at our state station and in New York have shown a slight increase after planting whole seed, but it is doubtful whether it is enough to justify us in planting whole seed in potatoes like the Early Ohio, or any of those where you can get large pieces having a single eye.

I have practiced for a number of years cutting potatoes in a certain way; if you take a potato and cut it into slices and hold it up to the light, if it is a good healthy potato you will see something apparently like roots running from the eye down toward the stem end. Now our scientific men tell us that they are the feeders of the sprout when it first starts. I have taken that for granted and have cut them toward the stem end. If the eyes are close together we cut two eyes on a piece, and toward the stem end there are often three or four eyes on a piece. That is the way we cut our potatoes and we have been uniformly successful. I don't think we have had a crop of potatoes in our home garden for a good many years, but what

would have run, if allowed to ripen, and where they have been allowed to ripen we feel sure of three hundred bushels to the acre, and we should hardly be satisfied if they didn't go as high as that.

J. M. TRUE—Is it advisable to put potatoes in a cellar where there is no light, during the latter part of August or the first of September.

MR. SMITH—I should prefer to pit them outside, from the fact that they are more exposed to the air in the cellar, and the quality of the potatoes might be affected in the cellar.

MR. FRANCE—Is there any danger of getting too much ashes on the land?

MR. SMITH—It is possible to get too much ashes on, but I think there is not much danger of it. That reminds me of one of my neighbors who was in my garden when I was putting on ashes. He said, Smith, do you like ashes for a manure? I said, of course I do or I wouldn't spend so much time and money for them. He said, I put them on my garden two inches thick on top and nothing has ever grown there since. I told him there wouldn't probably anything grow there for some years to come.

SUPT. MORRISON—When you store your potatoes eventually in the cellar do you have them covered over or do you exclude the light?

MR. SMITH—My cellar is a very dark one; if it was a light one I should have the potatoes covered over.

G. C. HENDY—I would like to put an acre of potatoes in this spring in sod, yet unbroken; how shall I proceed with it with the hope of getting a good crop? It is timothy mostly, and possibly some blue grass.

MR. SMITH—I never succeeded in getting a first class crop of potatoes from timothy sod; it doesn't decay quickly enough; I have tried it two or three times but have never made it what I would call success.

G. C. HENDY—Can you hope for success in raising a crop of potatoes after corn?

MR. SMITH—Yes, sir; I do it frequently.

C. P. GOODRICH—What do you think of the practice that some follow of leaving the potatoes in the ground and not digging them until they are afraid it will freeze up?

MR. SMITH—I think it is a poor practice.

R. D. SEELEY—In your flat culture do you find any trouble with the sun burning the potatoes, which we sometimes have with us?

MR. SMITH—Our ground is as mellow as a bed of ashes for nine or ten inches deep, and very few potatoes stick out and get sun-burnt, occasionally one; on a heavy clay soil I don't know but I would hill them some.

W. H. COLE—After you have got a piece of ground in good condition for potatoes, what success do you have in raising them year after year on the same ground?

MR. SMITH—I don't raise them year after year upon the same ground; I change the ground but not the seed.

R. D. SEELEY—I would like to ask the gentleman how he prepares the ground, and how he covers them, what implement he uses?

MR. SMITH—The ground is harrowed and made just as smooth as for a flower bed; we then have a marker that is made just like the old fashioned wooden hay-rake about twelve feet long, with something put on to draw it by, and the teeth reach back nine or ten inches; the head is full of holes and the pins are

loose in the holes, and they can be put in and set for six to twelve inches or three feet or anything we like, and we put this thing on the ground and mark the rows thirty inches apart. Then in planting we give a man a hoe and a boy a basket of potatoes, and they go and commence at the end of the row; the man strikes his hoe in and draws back the dirt; the boy drops in a piece of potato; the man steps forward about twelve inches and draw back the dirt and throws it into the hole made before; so every stroke of the hoe makes a place for a potato and covers one, and in this way the planting can be done very fast. The four acres cost me $10 for marking it off, planting the seed, etc.

GEO. MCKERROW—What crop would you prefer to follow with potatoes for the best result?

MR. SMITH—Well, a crop of potatoes leaves the land in splendid condition for almost any crop; if I was growing wheat I should try wheat.

GEO. MCKERROW—What crop would you have precede your potato crop?

MR. SMITH—Well, we are not particular about that, we follow corn very frequently.

SUPT. MORRISON—How about clover sod?

MR. SMITH—I should not hesitate to put potatoes on to it.

C. P. GOODRICH—How do you dig your potatoes?

MR. SMITH—We dig them with a six-tined manure fork, just go in and throw them out; two men will throw them out as fast as three pickers can pick them up.

SUPT. MORRISON—We have held institutes in some of the counties this winter, such as Waupaca and Waushara and Chippewa counties, where they are raising a great many potatoes. Up in Waupaca county I found men who raise forty, fifty and sixty acres of potatoes. There they use machinery largely, for the planting and digging of potatoes. We found one man in Chippewa county who said it cost him just seven cents and a few mills a bushel to raise his potatoes. He had got the thing figured down so close that it cost him less than eight cents to raise a bushel of potatoes. He raised something like ten thousand bushels on forty acres, but off from his ten thousand bushels he didn't make as much as Mr. Smith did from his four acres of potatoes. He said he would give any man $200 to take the crop off from his hands and pay the bills. That is a notable illustration where a man went on haphazard and raised forty acres of potatoes and didn't know where he was going to put them. Those potatoes were picked up, large and small ones all together, and the first car that went to Chicago were unmarketable. The all-round farmer must produce a large crop, offer it in the best condition, and know where to send it.

MR. SMITH—That car of potatoes where I used the ashes cost me only about eight cents per bushel.

# BREEDING AND FEEDING FOR BEEF.

By PETER WAKEM, Manager of W. H. Jacobs' Premium Herd of Short-horns, Madison, Wis.

### Selection of Sires.

One of the most essential points in the breeding for a beef animal is in the selection of sires to be used in your herd. I sometimes think it is of more vital importance to the successful breeder and feeder than good feeding itself. It is impossible to feed a steer successfully or profitably if sired by a scrub sire. It is just as necessary to have good breeding in a steer to make him feed profitably as it is to have breeding in a thoroughbred horse to make him run in front or to stay the distance required of him to win his race, or in a trotter to make him trot to the front. It is an established fact that in all domesticated animals, the longer you can get them bred in a line tracing directly through animals that have been of more than average merit as producers of the special product which they have been bred for, the more pronounced they will be in producing offspring, having their good qualities if properly mated.

These being facts you must be very particular in your selection of a sire. Do not use a grade—not even if he is fifteen-sixteenths pure blood. While he may be a good individual, the fraction of scrub in him is very liable to show itself in his produce. Select pure bred sires of known lineage, known to have come down through families that were great beef producers. There are plenty of them to be found, *especially* amongst the beef breeds, either Shorthorns, Polled Angus or Herefords or perhaps some of the other breeds, who lay claim to be great beef producers, but do not appear to be very successful in proving it.

### In Making Your Section

You should pay great attention to the handling of the animal. You must get the mellow, soft touch. Do not get too thin a hide as they are apt to be tender and not stand our winters well. Nor must you get too thick a hide, as I have never seen one that was a good feeder. Get a medium one, with a good coat of thick, mossy hair, that when you take hold of it it feels as soft as velvet. Get a sire with a good strong head on him, as they are sure to be the most impressive breeders, with a good heavy jaw showing the ability to crush an ear of corn. Get him with a good broad back, full over the crops and over the loins, as that is where the more valuable and high priced meats are. Thick through the heart, wide between the fore legs and standing square on them, showing plenty of constitution, short on his legs, as you never have seen a long legged animal of any kind or breed that would put his feed to good account; well let down in his flank, showing his ability to carry a good dinner. Get one well filled up in the neck veins, and well let down in the twist with a middling straight hind leg, so that if he is fed to a great weight, he will not be so apt to *break down* on his legs, with a good, mild disposition, and you have my word for it, that you will have a sire that will get good calves if properly mated, that will put on flesh rapidly and mature at an early age if properly fed and cared for. Never mind what color he is as it is not the color of an animal that tells you how much good meat you can put under his hide at the

least possible expense. In purchasing do not purchase some over-fed brute that has not been given exercise or properly fed. Nor above everything else do not buy some half starved animal that perhaps has not had any more exercise than the well-fed one, and in all probability has eaten more feed, but through the ignorance and indifference of his owner or feeder, has never either been fed regularly or fed a properly balanced ration, and expect him to prove as good a sire as one that has been properly taken care of.

### Care of Sire.

After you have secured and tried a sire feed him well; feed and water him regularly; give him plenty of exercise. Never forget that he is half your herd, as every calf you get should look more like the sire than the dam. Especially would this be the case if your females were grades. Having secured a sire that pleases you, keep the best lot of cows you can afford. If you start with scrub cows, get away from there just as fast as you can. Grade up, keep none but the best of your heifer calves for breeding purposes. Better feed a less number and better ones. There is very little excuse for any man who is making a business of breeding and feeding for beef alone, breeding any scrub cows. You can get pure bred cows, especially amongst the Shorthorns, with what is termed among some of the advanced breeders, as having unfashionable pedigrees and the Herefords so cheap that the wide-awake breeder and feeder of steers cannot afford to fool away his time feeding a steer that does not give a good account of the feed given him.

### Time of Breeding.

Having selected a sire and cows the next important point to consider would be the time of year to commence breeding. Much would depend on your buildings and stable accommodation, and the number of cows you have. If only a few cows and your stabling is good, you cannot be far wrong in breeding any time of the year; but if you have a large number of cows and your stabling suited to your wants, I would breed to have calves dropped in the fall. We have at present something over one hundred cows. I like our calves to come in September, October or November and have them come as near the same age as possible, as the more even you get them as to age and size the better they will feed together and the better they will sell when you get to market with them. My reasons for having them come in the fall are, we can take better care of them in winter than in summer. You can secure good help cheaper. You have your cows tied up and if anything goes wrong with them you have them where you can take care of them. If I wished to be successful in raising and feeding prime young breef, good enough to top Chicago market when from 24 to 30 months old, I would let the calves suck and let them have a cow each. I would not attempt putting two calves on one cow unless in cases of an accident with the dam, or perhaps you might want her to supply your home with milk and butter. I would much prefer raising one good steer calf to raising two poor ones. I would let calves suck three times a day, dividing the twenty-four hours as to time as nearly equal as convenient. Castrate when two weeks old, and when a month old start and give them a little ground feed with some sliced roots, a good ration for calves is 2-3d crushed oats and 1-3d corn meal and wheat bran, with what roots and hay they will eat. You must be very care-

ful in keeping a cow's udder well milked out. They must be inspected and milked out after each time the calf sucks, or at least twice each day. Because if your cow should happen to lie down and get a teat dirty, the calf will not take hold of it, unless washed clean. Keep calves away from cows except when sucking, and always have plenty of clean water where calves can get a plentiful supply, as they will drink a little quite often. Have your calves kept in a yard where they can get plenty of exercise in fine weather. Keep your stalls or basements well bedded with straw, well lighted, with plenty of ventilation and not too crowded, rather have them divided in small numbers.

### Care of the Calf.

I am often asked why I let the calves suck and would it not be better to milk the cow and feed the calf, my answer is, no, it would not. A man can let out one hundred calves and let them suck easier and quicker than he can milk two cows, especially if one of them does not care much about being milked, and another reason is, you cannot raise as good a calf by feeding it the milk as you can by letting it take it in the natural way. Not so many chances of the calf taking too little or too much if it helps itself. And a better reason than either is I am feeding to get beef that will bring the top price of the market while the man who trys to raise calves on skimmed milk, and wind is feeding for the bottom price and the two prices are a considerable distance apart one not quite so profitable as the other.

### Fall Calves.

Another point in favor of fall calves is, you have your calves weaned, and your cows dried off if you did not see fit to keep on milking them, when they could easily be kept apart and turned to grass. And you also have had your cows in the yards when you could attend to their breeding, and not have to chase all over the pasture after an excited cow, as is often the case when you want her. You would have your cow dry and in calf when turned out, and she would have a good opportunity to recuperate and be in good flesh before calving time, and all through the months when flies are so annoying. Your cows would have nothing to do but stand around under the shade of a tree, or in the water up to their knees, chew their cud and fight the flies, gaining strength to produce another lusty calf while you could set out on the porch and fan yourself in your easy chair, or go to town and talk politics if you could find nothing better to do on the farm. Wean your calves when about six months of age when you would find it quite necessary to give your cows considerable attention in getting them dry, much depends on whether you wish to develop their milking qualities to any great extent, we sometimes milk them until well along to having another calf.

### Keep the Calf Growing.

Well, having weaned the calve you never should allow it to lose any of its calf fat, always keep your steer a growing. I believe it pays to feed a grain ration from the time your calf is a month old until he is shipped to market, whether on grass or not, I do not mean to keep them on full feed. But keep them growing fast, as all steers should be marketed when from twenty-four to thirty months of age and should weigh at twenty-four months in the vicinity of 1,500. I believe the most profitable time to finish your cattle for market is summer as they, if properly fed will put on flesh rapidly while on grass. And if you have been

using the right kind of a sire, one that has the qualities necessary to insure you an early maturing steer, you will have them ripe enough to top the market when two years old. The time has gone past when the breeder and feeder with brains keeps his steers until they are three or four years old. The time was, and not long ago either, when prizes were given for four and five year old steers at Chicago fat stock show. The board having control over that great show have given notice to all intending exhibitors that this will be the last year they will give any prizes for three-year-old steers, showing that they are not going to encourage the feeding of any cattle that do not mature early.

#### Better Prices in the Future.

The markets for selling cattle have been somewhat depressed for some years past, but it looks now as if we had reached the turning point, and that those who have been steadily breeding and importing their herds, using none but the best sires to be produced, feeding judiciously, would reap a reward that would be quite satisfactory to them, as much so, perhaps, as any other stock kept on the farm or any other line of farming. There has been an immense number of cattle exported in the last year, and the feeder of good steers has made money, and there would still be a better price paid for steers if we raised better ones. The English people are much more a beef-eating people than we are, and they will pay a good price for the best beef. While in England a few years ago I saw American and Canadian beef hanging in the markets, both in Liverpool, Bristol and London, along with beef bred and fed in England, marked from a penny to three pence per pound cheaper than the English beef. And it is still done in all the markets over there where our beef is handled. Now, this would not be so if we kept a better class of cattle and fed and matured them as we should. I have heard it claimed our cattle lost flesh going across the water. This is not so, as they put on flesh every day they are aboard ship if they encounter no storm or very rough weather. A few men have nearly controlled the export trade of the past. A friend of mine, who exports from 75 to 100 cars a month, went to Boston a few weeks ago to make a contract for space to ship cattle, and was informed by two different steamship companies that when the contract he had ran out, they could not ship any more cattle for him for six months, as all the available space on all their steamers was under contract for that length of time to two men from Chicago. Exporters have made large sums of money in the last year, but the time is not far off when that great trade will not be controlled by so few men.

#### English Capital.

There is too much English capital looking for an investment in this country to allow it. I always feel ashamed when at the stock yards at Chicago, and see the class of steers unloaded from railroads coming from Wisconsin. It always looks to me as if we were feeding for the bottom price instead of the top one. Now, to the farmer who is located especially quite a distance from town, I believe if he understands his business and uses his brains and gives it his attention, there is more money to be made in breeding and feeding cattle for beef than can be done by handling them for any other product. You can keep up the fertility of your farm and do it with less labor and with more real pleasure

than by any other style of farming I know of.

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DISCUSSION.

GEO. MCKERROW—I would like to ask if Mr. Wakem approves of grinding feed for steers.

MR. WAKEM—The profits of grinding it would depend upon whether you have got hogs following or not; if you have got hogs following I don't believe it pays to grind the feed, especially where you have to hire your help.

THOS. CONVEY—Does it pay to cut and feed shock corn to steers?

MR. WAKEM—We think it does.

THOS. CONVEY—Does it pay to shell it or husk it?

MR. WAKEM—A great deal would depend on the age of the steers; if a year old I think it would pay to husk it.

THOS. CONVEY—Does it pay to cut it up with a feed cutter?

MR. WAKEM—Three years ago we were feeding 20 to 30 cattle, and we had to hire all our help, and we cut all our corn for both our cows and for steer feeding. I came to the conclusion then that it didn't pay on account of the amount of help it took to run it through the feed cutter. We have not followed it since. One reason for not doing so is perhaps because feed has been cheap, hay has been so cheap with us.

THOS. CONVEY—Does it pay to feed bran and shorts with corn in fattening steers?

MR. WAKEM—I have very little confidence in feeding shorts. I have always fed a great deal of bran, perhaps more than anybody in the state. I think that bran is one of our most valuable feeds in regulating grain.

JAMES JACKSON—How are you going to make money in making beef on thirty cent corn, and selling the beef in Chicago for five cents a pound. How many pounds of corn will it take to make a pound of beef, or how many pounds of corn do you feed a good healthy steer every 24 hours?

MR. WAKEM—I don't know, the cheaper corn is the more profit there would be in feeding it to steers that sell for five cents; but there are very few of our Wisconsin steers that bring five cents a pound, more bring two and a half, because they are a class of steers bred from scrub sires, half starved until they are 18 months old, and then fed whole corn and turned off before they are half fat. As to how many pounds of beef you get from a certain quantity of corn, that comes under the subject matter of the paper following mine, and I do not wish to trespass upon that subject.

C. R. BEACH—What is the value of ensilage for beef production?

MR. WAKEM—I have had no experience with ensilage. Instead of feeding ensilage, we are feeding rutabagas to our young stock and cows, and with as much satisfaction as anything on the farm.

J. M. TRUE—As I understand your paper, you recognize the importance of the constant growth of the young animal. Now, what grain feed would you feed a calf while it is having milk from the dam at the same time?

MR. WAKEM—I give a ration of two-thirds oats and one-third corn meal and bran with roots, and what hay they would want. This is for young calves until about the time they are weaned. I think the best calves I ever raised were fed on shelled corn and oats and a little bran. I suppose that roots take the place in a great measure of ensilage.

C. P. GOODRICH—I understood you to say that it didn't pay to milk a Shorthorn cow; was I right?

MR. WAKEM—You understood something that I didn't say.

C. P. GOODRICH—I will ask you the question, if you do think it does?

MR. WAKEM—Some of them do. I have seen Short-horn cows that give more milk than any Jersey that ever stood on earth. Two years ago we had a three-year-old heifer, and she was considered a beef animal, and before she was three years old she weighed 1,900 lbs. and shortly after having her calf we milked from her twice a day twelve quarts besides what she gave to her calf. The cow was shortly after sold to go to South America.

C. P. GOODRICH—I have a statement of one that I had that gave sixty pounds of milk a day, a Shorthorn cow, and I never made a cent of profit out of it. Have you made a practice of turning off yearling beef, twelve to fourteen months old?

MR. WAKEM—No, not as a general practice. The time of turning off beef depends largely on whether you have raised your steer from calves, or whether you have bought them from parties who have not taken proper care of them, and perhaps have had no breeding that would insure you early maturity; in that case I do not believe it would pay to turn them off young.

C. P. GOODRICH—I want to tell you a little incident that I learned from a Short-horn breeder in Iowa, Mr. Wylie, of Castania. I saw him I think in 1884 and he told me what he did the year before. He turned off a carload of yearlings, probably fourteen or fifteen months old; he had crowded them, as is his practice, all their lives, made them grow as fast as he could. This was an experiment; he had never sold under two years before; he sent a carload and got $7.50 a hundred; they averaged ten hundred, and he got an average of $75 apiece for them. He said he made more money on those than he had on any others, and intended to practice fatting in that way in the future.

C. R. BEACH—What pasture grass do you prefer for summer grazing of steers?

MR. WAKEM—I would rather have blue grass than any other grass that I know of for fattening steers on.

G. C. HENDY—I rather infer from the paper that he allows the calves to go to the cows, or the cows to the calves and take their milk twice a day; now I would like to know what convenient arrangement he has for following out that plan?

MR. WAKEM—Until the calves are two or three weeks old they are kept with their mothers. After that the cows are tied in a large stable holding seventy or eighty stanchions, and the calves are kept in box stalls by themselves, a certain number in each stall. They are all turned out together, and after going once or twice they will soon find where their mothers are, and will go there themselves; their mothers are tied in the same place every day, and we have no trouble in getting them to go there. Sometimes there will be a calf or two that doesn't get enough milk from one cow and will steal around a little, but not often. As soon as they are done sucking they are allowed to run in a yard where they will have water, and kept there until they go into the stalls again.

MR. DENNIS—Do you think the cow will pay with the raising of the calf alone?

MR. WAKEM—If we didn't think it paid we wouldn't keep the cows; we would go out of the business.

J. H. WISE—I would like to know what he calls an unfashionable pedigree?

MR. WAKEM—I suppose that most everybody has heard that there is an unfashionable cross in Short-horn cattle. In 1817 a gentleman by the name of Sanders went to England and imported some cows and a bull or two. The people that he bought them from had not kept a proper record of them. They were registered by Mr. Allen at Buffalo in the herd books in this country, but as Short-horn cattle became more numerous those tracing back to this importation have been called by a certain class of people unfashionable. There was also one bull, Red Rose by Earnestie, that was used by Mr. Bedford that did not have a record in the old country, though he had one in this country. I know a man in Wisconsin, some of whose cattle come of cattle bred by Henry Clay, of Kentucky, and he said that his word was sufficient without a pedigree; that was the way with the English breeders, their word was all that was necessary, but people are paying a great deal more attention to pedigree now than formerly.

J. M. TRUE — These unfashionable lines are called Seventeens, are they not?

MR. WAKEM—Yes, and others are called the Earnestie cross; some of the best animals today trace to those animals.

R. D. SEELEY—Are they not good beef producers?

MR. WAKEM—They are some of the best producers known. They have perhaps been followed a little further for show cattle; some of the best cattle I have seen are straight Seventeens.

JAMES JACKSON—Are not the Seventeens generally good dairy cows?

MR. WAKEM—So much depends on the manner in which Short-horn cattle have been handled that while some are very good dairy animals, others are not so good; the development lies entirely with the man handling them.

R. D. SEELEY—Have you had any experience in feeding green corn in fattening cattle; the best results I have experienced I obtained while feeding green corn.

MR. WAKEM—I have not had much experience in that.

R. D. SEELEY—This year my pasture became short and I didn't like to sell my cattle, as they were hardly fat enough, and I started cutting corn and feeding it, and I noticed they began to gain immediately, and on that feed I think I had the best results I ever had with fattening cattle in a dry time. They brought four cents on the market.

JAMES JACKSON—I would ask Mr. Seeley how long he fed these cattle green corn?

R. D. SEELEY—I fed them six weeks and they averaged when I sold them 1,500; they had been wintered the previous winter on hay without any grain ration at all, and were turned out into the pasture untill the drouth came on and the pasture became short, and I then started in and fed them for six weeks on this corn, and they did remarkably well; of course the last of the feeding I snapped the corn as the fodder was getting a little too ripe.

J. M. TRUE—The age of the steers, Mr. Seeley?

R. D. SEELEY—They were three years old last spring.

JAMES JACKSON—Was this four cents the market price or at home?

R. D. SEELEY—They brought four cents in Chicago and it was a good price at the time.

JAMES JACKSON—What month did you market them in?

R. D. SEELEY—They were marketed some time in October, I don't remember the exact date.

JAMES JACKSON—I finish my steers on grass; that is as far as I take them, and then I take them to market. My experience has been since I have quit feeding corn that I come out on deck a little every time; but when I fed corn I always get a little behind.

MR. WAKEM—I suppose the persons who bought your cattle took them to southern Illinois and fatted them on corn and brought them back and got a bigger price.

JAMES JACKSON — The gentleman is mistaken as to these cattle being shipped into southern Illinois and fatted they were shipped east for the eastern market and I got four cents a pound for them. They were not fed grain but were kept on the pasture. I work it so that I am never short of pasture. They weighed just twelve hundred pounds and were all three-year-old steers; they topped the market for grass fed cattle, and the man that bought them bought them for corn-fed cattle.

MR. WAKEM — It is very seldom you strike such a man there.

JAMES JACKSON—I would like to know if Mr. Seeley can give any definite proof that he got what his corn was worth a bushel by feeding it to those cattle?

R. D. SEELEY — I judged by my eye and I would just as soon trust it as a a scale. I could tell every day that they were gaining, could see that their hair was getting glossy and nice.

MR. JONES—I think weighing cattle is no criterion anyway; you might make them thirsty and then have them drink and make them gain ten pounds a day.

JAMES JACKSON — I would state in regard to making these cattle better, making them five cent cattle, that the day I was in Chicago with these cattle, in 1889, the first five cent cattle crossed the scales, and it was considered a boom in the market, and there was considerable talk among stockmen about these cattle. I struck the boy that sold them—they were Illinois cattle and of course I was interested in how he had made them, how he had bought them and what they had cost him. I asked this boy to give me the figures on those steers, and what his profit had been. "Profit!" he said, "Good land! if I had fed a thousand like I have fed them, it would have taken a national bank to have paid my debt." He was in Illinois and fed 25 cent corn; I am in Wisconsin and must feed 30 cent corn. The Illinois climate is a better climate for fattening stock than Wisconsin, and if he couldn't make a profit with as good a lot of animals as he had, I claim that I have no business trying to feed or select stock against him.

JOHN H. WISE—We made an experiment by weighing both steers and feed on a Fairbanks scales, which lasted from Jan. 12th to March 3d, or 50 days; during this period the 17 steers ate 20,638 pounds of grain, about one-third oats, and two-thirds shelled corn, this grain with a little hay made a gain of 2,210 pounds, figuring the grain at half a cent per pound it cost us a trifle less than 4¾ cents per pound of gain, or per pound of beef.

I figure that the droppings the hogs get will easily pay for the hay, and the manure for the work.

C. R. BEACH — How much did the steers weigh?

MR. WISE—About 1,350 when we commenced.

JAMES JACKSON—What was the corn worth a bushel that you fed those steers?

MR. WISE—Well, we bought a good deal of the corn for 28½ cents a bushel.

JAMES JACKSON—Did you have the

corn hauled to you or did you haul it yourself?

MR. WISE—We hauled it from the cars, a distance of about a mile or so.

JAMES JACKSON—How many pounds of corn do you say you fed each steer a day?

MR. WISE—I didn't say how much we fed a day, it is only a test in the total. The test lasted from January 12th to March 3d, or fifty days, and during this period the 17 steers ate 20,638 pounds of corn, which with the hay fed, gave a gain of 2,210 pounds.

JAMES JACKSON—What was the cost of the corn?

MR. WISE—I figured it at half a cent a pound.

JAMES JACKSON—What was the beef worth that you put on to those cattle?

MR. WISE—I got four cents a pound for them.

J. C. MARTIN—We have tried a little experiment at our place, though I never expected to repeat it in public. I have some young boys and in order to encourage them I made them the following offer. I had bought some cattle at a sale for two cents a pound, and I gave the boys two each on the condition that they should pay me one dollar a hundred for ground feed. They were to weigh the cattle once a week. The boys kept an accurate record in which they set down the temperature, the average gain per week, the amount of food they bought, using their own judgment as to the ration they fed. I cautioned them to feed carefully and to see that what they fed was eaten up clean. They fed the grain at that price, one dollar a hundred. I sold the cattle at three cents and a half a pound. The boys made a profit of nearly twenty-nine dollar after paying me the price of the cattle when bought and a dollar a hundred for the feed.

H. ROBBINS—Let me give you an account of an experiment of mine. I had three steers which I weighed on October 7th; one weighed 1,190 pounds; one weighed 1,290 pounds and one weighed 1,335 pounds. They were weighed again on November 12th, after feeding them for thirty-five days, and then weighed respectively 1,340 pounds, 1,390 pounds and 1,480 pounds, which gave an average gain of four pounds per day for every steer. My boy carried on a similar experiment at the same time and his steers made a gain of five pounds a day for thirty-six days, but it cost him a little more a pound to do it.

SUPT. MORRISON—I will call on Mr. True to summarize what has been said in reference to this topic.

J. M. TRUE—I feel that this is an important subject, and it would not be dealing justly with it if it was dismised in the present condition of this discussion. While for the past few years the production of beef in the state of Wisconsin has been up-hill business, I think that we begin to see light ahead at the present time and to recognize the fact that within the coming few years, if our beef cattle are well bred and well fed, we may expect as good results from this enterprise as from any other. But it does seem to me that there is danger in the manner in which this discussion has been carried on of losing sight of the vital principles than must maintain themselves as the under current in the production of good work. Wherever, in this state or elsewhere, beef is to be produced in the future at a profit, these cardinal principles must be observed. the steer must be well bred and he must be well fed from the time of his birth until he is put upon the market. The idea that any animal, horse, or cow or steer, is to kept upon a Wisconsin

farm for a portion of its life, and allowed to stand still or to go backwards, is a thing of the past. If there is to be any profit made in the future in this business it is to be by keeping the animal growing continuously, and I hope we will not lose sight of this fact in connection with this industry, where, equally with any other, these facts are important.

SUPT. MORRISON—There is a gentleman in Clark county by the name of Burpee who buys up cattle all over the county and sends them to the Chicago market. He said that two years ago he took down two carloads for which he had paid one and a half and one and three quarters and as high as two cents a pound in Clark county. They were sold at the stock yards and he noticed that the gentleman that bought the steers was an old feeder, and he made out to get acquainted with him and learned that he was from southern Iowa. This gentleman took those steers out into Iowa. Mr. Burpee gave at the Neillsville Institute his conversation with the Iowa gentleman. He said: How long do you expect to feed these steers? He said he would feed them until about the latter part of May and he would then bring them back to Chicago. He had to buy his grain and he didn't own an acre of land; he had to buy everything that was fed and he would sell those steers at four and a half and five cents a pound. Now you can see where he was going to make his money; he was going to make about two and a half and in some cases three cents on not only the original weight, but he was going to put enough on to the steers to pay for feeding them. Mr. Burpee said that opened his eyes. He came home and commenced feeding and marketing his steers the same as the old Iowa feeder, and he was making a success in producing beef. Such suggestions as these thrown out in the institutes give us some idea of what we can do in the production of beef, in the way of making money in the business.

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# CAN BEEF BE PRODUCED IN WISCONSIN AT A PROFIT?

By H. C. THOM, Dairy and Food Commissioner.

**One Could Say No.**

And be seated with objections from few, if any, feeders, while the phiz of the dairyman would beam with complacency. Feeders can ill afford to let affairs, which so interest them go by default because there is no man brave enough (barring Senator Vest), to champion an industry to which civilization owes so much. An industry which touches every man who has reared a male calf or lugged a soup bone from market. An industry which extends throughout every state and territory and effects every man's household, unless it is sanctified throughout the whole year to Lent. Flesh always has a market. Some one is bound to furnish it to our millions. Feeders have sworn a mighty swear that they could

not afford to continue the business. Many have given up in dispair. They are going to try the cow. They don't know how she is made, let alone how to milk her. Herdsmen of the west have quit their calling; some of them are robbing stage coaches. It may pay a little better but it takes more courage to hold up a driver than it does to tie up a steer. We are a little down in the mouth in this section. A catch calf that runs with its mother the first year and the next two with grass, straw and water don't kindle the Chicago stock yards with enthusiasm.

**The Scrub Has Been Looking**

For its place for many years. At last "'tis found, thank God"; 'tis at the bottom of the mrket report.

**Those Breeders and Feeders**

Who think, begin to see how railroads affect their trade. The circle of competition has been enlarging very rapidly for a number of years. Chicago, the center, with a circumference 200 miles away meant the only competition. Kansas City dressed beef is now laid down on our market before it gets quite cold. In talking with a conductor on the Burlington road some few weeks since he stated that the week before he ran from St. Paul to Chicago ahead of an express with a train load of cattle. It costs but little more to ship beef from Kansas City than it does from Madison. Do you wonder that the business does not pay if we make poorer cattle here than in Kansas? Our only protection in the past has been that but few were in the business and that it cost so much and took so long to bring cattle from distant points.

These safety guards have all been knocked down. There is one salvation for us and only one; that is skill. Skill in breeding; skill in feeding. Any leather head can have a calf or buy one. It's directly in his line of business. He can keep him alive if the weather is propitious or he carefully reads Sergeant Rhodes' reports to know which way the wind blows. A machinest commands better wages than the ditch digger and works no harder with his hands. There is not half the competition in brains that there is in brawn. Wood must be hewn but less money secures that result than it does to fashion the mind in the school room or souls from the pulpit.

**Good Stock and Economical Feeding.**

The trouble with the cattle business at present is not so much the low prices they bring as it is the kind of cattle that are thrown on the market. Good stock is bringing better than $5 per hundred to-day, while most cattle are changing hands at from $1.75 to $2.50. Beef can be made on Wisconsin farms at $4 per hundred at a fair profit. Lower prices than $3.25 are ruinous to most feeders. As near as I can estimate beef can be produced at about $3 per hundred. That this can be done can be figured as absolutely as that butter can be produced at 13½ cents per pound, or that calico can be manufactured for 3¼ cents per yard. Three conditions are essential in order that meat can be produced at this figure. First, good stock; second, economical feeding and handling; third, early maturity. In some respects cattle are like men. The lean and hungry ones, although great consumers, are rarely fat ones. Your attention is respectfully called to the president of this association. It makes some men tired to carry around what they eat; others of closer build and more quiet consciences are content with what they get

and ruminate over the cud of the eternal fitness of things and grow fat. The racer is the result of long years of careful breeding. The bullock, although of greater bulk, represents just as much skill as the courser. There is a strong sentiment in many minds against inbreeding. In a broad sense the tide may set the right way, many of us undoubtedly need training to know just what to do. It might be well to say here, however, that the Short-horn breed was best developed and perfected in the hands of a man who brought this about by the severest practice of inbreeding. The animals grew under his careful eye in grace and beauty. Desirable points were strengthened and developed; weak ones were eliminated and destroyed.

An abiding faith that skill would win brought about the grandest results, made the name of the man immortal, and left a race of cattle that lovers of graceful lines and colors will fall down and worship, for verily they were golden calves whose mothers would sniff at the sacred cow. The feeding and handling can be best brought out in the discussion perhaps, because I can then call to my aid men of greater age and experience. My experience has given me radical ideas on these matters; they may not be progressive, surely they are honest.

### Early Maturity.

The question of maturity next demands attention. Three and four year old cattle are unprofitable. Thirty months is an extreme age to turn off. The first 600 pounds is cheapest. I know of a five-year-old steer that was kept 365 days eating as many pounds of grain and hay as when four years old and gained never a pound. Feeding experiments at our Wisconsin station gives ample data to clinch the statement that the quicker the maturity the greater the profit. That feeders complain is not to be wondered at. The stock yards evidence criminal bungling. Matched clear flooring is worth more than cull lumber. A poor ax helve finds a customer only in a plug chopper who splits kindling wood for his wife at the back door and does that little under protest. Yet Mr. Jones, of Dane county, sends a steer to Chicago that makes the average Texan stare, and kick because he does not get top market. The steer is not to blame, O, no! "Jones made him and he pays the freight." Jones would not expect a big price for poor eggs but he does for poor meat. Experience is not quite so strong in the latter business. When he "goes broke" Jones will wake up.

### Animal Husbandry--Fertility.

It is all folly to talk of going out of the stock business. It is the true foundation of rotation. Without stock, farms would rapidly deplete in fertility. Wisconsin farmers have had a bitter experience and won't be caught again. It takes as much time and costs as much money to restore a lost fertility as it does to clear and break the original homestead. I would suggest that the general market might be improved if more attention could be given by our foreign consulates to this great industry. With much regret I am constrained to say that few of them know or care how much could be done in this direction. Nothing but flimsy excuses stand in the way of heavy exportation. Many of the so-called rulings are in direct violation of existing treaties.

The thousands who are in the business of beef production, the millions of money invested, should demand recog-

nition and a channel paved to good foreign markets. That herdsmen may not become discouraged, I beg to call attention to the fact that we are growing faster in our demands than we are in skill in breeding and feeding. It is but a few short years since steers were changing hands at $12 per head when two years old. Just such cattle as we think ought to bring $5 per hundred. What right have we to ask this? This right. That we wish to ride in a carriage. A wagon used to answer. Wheat, so we say, can't be raised for 75 cents a bushel. My father used to raise it for 25 cents and haul it to Milwaukee with a team and kept up a cheerful whistle and raised a lusty boy with a good appetite. Ah, yes, luxuries of those days are necessities now. We are fighting the battle of life against greater odds. Our wants are growing faster than means for supplying them and we kick the Big Four, the steer, the market, and scold our wife because things are awry.

**The Eye of the Master Makes the Animal.**

A good animal well matured and finished with a sleek coat, with a good distribution of muscle and fat will bring more money, more content and smooth more wrinkles and keep back more gray hairs than all the petulant fault finding that ever rose to heaven. "The eye of the master makes the animal." Keep the old saying in mind. Bind your fortune to the Short-horn. They have had a glorious past, they are steady in the present, and the future is full to repletion of bright promise. "'Tis a popular fallacy that because a thoroughbred costs a large sum that he will thrive and fatten on ragweed and water. Profit comes to no man by shirking responsibility and labor. Give the animal care, treat him kindly, and shelter him and feed him, then will he grow under the master's eyes and conform to the measure of an ideal. Out of all this labor and love will spring a result that will be a credit and an honor to all these years of line beeding, to the men who have fashioned the Short-horn, by a long term of study, to be a thing of beauty and profit forever.

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# FUTURE PROSPECTS AS TO THE PRICE OF BEEF.

By MR. GEORGE WHICHER.

**The Beef Question.**

It is said that beef cattle are higher by 80 cents per hundred than one year ago—and many predict $1 a hundred higher in the next 12 months. This would be something of a boom in the general market for cattle in two years, and as I sincerely believe the day of booms are past I fail to see it in exactly that light. Let us examine the question and see what conclusions we can deduce from the experience of the past. It is true we of the great central northwest, have been reduced to a minimum of prices below the cost of production, owing, I think, in a great measure, to

over-production and free grass on the western ranges, I claim has been the main cause of this over-production and low prices. I, of course, ignore the cry of monopoly of Big Four, and only wish there were more of them to get away with the surplus—for surplus it is, view it in any light we please—too many cattle for the demand.

### The Cause.

In the last ten or twelve years, as the extensive system of transcontinental railways opened up the mountains and southwestern ranges, even to the Pacific coast, the then existing high prices stimulated over-production on the ranges. Cattle companies were formed, which with free pasturage created an over-supply, and as we of the productive lands of the interior basin of the central northwestern states kept right on producing, and we know we have to keep up our lands to the requisite tilth of production—it has created an excess of beef cattle and a consequent low price. Eight years ago this winter I was in Texas and attended many cattle conventions as a newspaper correspondent. The cattle boom then was near the crest of the wave and many ranchmen were selling their cattle ranches, herds and brands, because, said they, these prices cannot continue, and yet the boom went on for two years thereafter, and some of these conservative cow men, as they call them in the southwest, re-invested in their well sold plants at a higher price to afterward lose all. I saw cattle in the Kansas City stock yards in April, 1882, selling from $6.85 per hundred to $7.25, that in Chicago to-day would not bring over from $4 to $4.75, but a little over one-half. I saw corn selling in eastern Nebraska—Cass and Lancaster counties, at 60 cents to feeders—that in the same localities to-day, won't bring over 17 or 18 to feeders of the same grade of cattle.

### Sheep Husbandry Booming.

Sheep men at the stock conventions were hardly recognized, while today a carload of fat wethers or lambs are worth more than a car of cattle. Wool appears to be no criterion of the value of sheep, but it is the demand for mutton. The lambs with the little wool on them that would hardly amount to twenty-five cents a head, are selling in Chicago markets today for $6.85 to $7 per hundred.

Really, if the sheep produced no wool at all, we would save very near the present price for mutton purposes. And right here is a point before we pass, I desire to call your attention to. That there is an independent demand for the various lines of meats, that a plenty or over-supply or cheapness of others cannot control. Some one might say if beef and mutton were both cheap, a mutton will never see six or seven cents again; cheap pork or beef will take its place. And we might say now: why do they pay $6 and $6.50 live weight for fat wethers, 7 cents for fat lambs live weight? Why don't they supply their place with those splendid 4 and 4½ cent paraded steers. Our answer is, there would be a demand for a certain amount of mutton if the price went up to 10 cents a pound live weight. And the same rule applies to beef or hog product. I mean, of course, for fresh or block meats. Cured product is always more even in price. Yet we could not think of making any of those high priced products a speciality, if we did we would get left. The men making money in booms of any product on the market that comes up suddenly, are those who

invested when the price was way down, and when they touch fancy prices they clean up the last head of stuff on hand. The men who fish for clams at high water generally go out with the tide.

### Don't Give Up.

Now, as to this cattle problem, should we of upper Mississippi and Missouri valley, say we can't raise cattle at this price, and go out of the business, it would be a virtual surrender of the business to the range and Texas producers, we can't afford to do it. Let us keep hammering away, it hurts, but it is a battle with the range and Texas producer.

We are in the condition of Æsop's fable of the fox in the brambles. It is true, said the fox, that the brambles hurt my poor tender hide, but then I'm wearing out the hounds who are seeking my life. Yes, keep on a while longer, my friends, it is tough, it is hard, but with our cheap beef we are bankrupting cattle trusts on the ranges and in the southwest. They went in on a big thing, free grass, cheap fence. Let us make our pastures big enough, said they, that a pound of barb wire will fence an acre. Four or five cents an acre for pasturage, why those prairie grangers can *never* compete with us. But their calculations didn't fill out. The dynasty of these cattle kings were short lived ones. They could ship a few loads occasionally to keep up appearances, but the day of judgment must come eventually.

As Dean Swift expresses it in the South Sea Bubble:

> "So fishes rising from the waves
> Can soar with moistened wings on high,
> The moisture dried, they sink again,
> And dip their fins again to fly."

Yes, we sympathize with you western fellows that wanted to inclose the whole earth with barb wire.

The Swan Brothers first began and they soon had plenty of company. Like we have seen pictures of herds of buffaloes driven to a precipice by Indians, the first goes under and the herd follow to snow him under; so, in conclusion, I will say I wan't to see no boom at present in cattle—I don't believe there will be—but just a sufficient stiffening of prices that we may wean the rank fellows out a little easier.

We particularly felicitate you on your cheap fencing and fine grass; but behold, we will mock at your calamities, we will bewail you when your fear cometh and keep right on raising cattle cheaper than you can; so don't be disappointed, but keep right on pegging and hammering away, we'll fetch them after awhile.

# SHEEP SESSION.

## CAN THE MERINO BE PROFITABLY MAINTAINED ON WISCONSIN FARMS?

By W. H. COLE, Waterloo, Wis.

In a state situated as Wisconsin is our present and future prosperity depends largely upon our animal industries. The average farmer living isolated from cities, or villages, who depends upon grain raising to the exclusion of animal husbandry, will sooner or later, come to grief. And in a state like this, with so great a variety of climate and soil, and with a people of such a diversity of tastes and surroundings, there is room for all, without danger of jostling or crowding each other. And the pell-mell rushing from one industry to another, that has characterized us as a people, simply because it is paying better at the present time, is unwise.

**"Make up Your Mind and Then go Ahead."**

Experience has taught us, that by the time we get established in our new undertaking, the one we have just left is paying better. And we have been to an expense (and often a large one) in changiug. Besides a knowledge of a business is capital in stock, and the man who knows the wants of an animal and has the conveniences for supplying them, can often come out successful, through a term of low prices by cheapening production; while one unacquainted with the business will fail. So I would advise one who has a knowledge of the dairy business and conveniences for it, to push it with energy and perseverance. While he who has a good market near his home, and has conveniences for it, can make money raising early lambs from the mutton breeds, if he puts a proper amount of brains into his business.

**Sheep—Fertility—Wealth.**

But for one who wishes to keep sheep in large numbers, or the common farmer who wishes to keep a good flock of sheep to work his straw and roughage into a condition to keep up the fertility of his farm, I believe there has no animal paid better for the past twenty-five years than the Merino sheep. In speaking of their working down roughage, I do not wish to be understood as confining them exclusively to such feed. The flock-master that does not keep his flock in a good thrifty condition, does not reap the profit from them which he otherwise might.

And the one who breeds for heaviest fleece on the the smallest carcass is not up to the times. I have always made size a specialty; and for the last ten or fifteen years, I would accept for breeding purposes none but a large, broad-backed sheep, with a long staple of wool. Such sheep as these pay well, both in mutton and wool; and that such sheep when ripe, do not go begging in markets is attested by the fact that I have sold three

carloads within the last ten years pronounced by Chicago salesmen as good as the best. I feed from one to three carloads each year. And on one occasion they sold fifty cents higher than anything else on the market that day. And this year, while in the central part of the state attending an institute, I got a telegram from our home buyer that he would give me five dollars a hundred for my sheep. So elated was I with the prospect of selling something these dull times without running after the buyer, I sent back word that he might have them.

The question as to whether Merino sheep can be profitably maintained on Wisconsin farms is answered by the fact that there are hundreds of farms scattered through this state devoted to grain raising that keep but little stock, that could raise more grain than they are now raising, and keep one hundred Merino sheep in good condition on each eighty acres.

### Paths of Gold.

This is no idle speculation. I have given this problem practical tests nine years ago this spring. I bought an eighty-acre farm which had produced but few paying crops for a number of years previous. The first year that I worked it it did not pay expenses, as I was obliged to work it in the condition it then was. In the fall I ran a fence through the center, turned one-half into pasture, emptied my sheep stables on the other half and continued to crop it, and have had bountiful crops ever since. Four years ago this spring I bought a 160-acre farm that had but little stock kept on it from the time it was entered from the government until I got it. I treated it as I did the first one as nearly as possible and with like results. I know from experience and observation that when you put it into practice there are no animals better calculated to revive and sustain the fertility of a farm than a flock of well-kept sheep.

We hear people say: "That man is lucky; he always manages to have good crops, or he always has butter to sell when it is high, a fat flock of sheep to drive off when they bring a good price." All things being equal, the farmer is lucky that has a fertile farm, and is generous enough to keep a sufficient number of thrifty animals to retain its fertility. In other words, that farmer is lucky who is not continually trying to get something for nothing.

### Care of the Flock.

One word as to the mode of caring for sheep. Do not turn your sheep into a pasture and keep them there until snow flies; but sow a couple of quarts of clover seed with each acre of your sowed grain, and in the fall when the feed gets a good start turn your sheep on that which you do not wish to mow. It helps to keep up the fertility of the soil, keeps in check most all kinds of noxious weeds and fits your sheep nicely for winter feed.

If you have a large flock, do not let your lambs run with their mothers until winter, but separate them when four or five months old, and turn them on good succulent pasture and if it is in connection with your corn field so they can run through and crop off the weed seeds, this will be all the better. But do not confine them to a corn field, and as feed gets scarce and dry, bring them into their winter quarters at night, and feed them; thus introducing them to to their winter feed by degrees. In a word, put the same time, care and thought into your business, that the lawyers, doctors and merchants have to put into theirs. You

will not then have to say that any fool can be a farmer. But rather if a boy has not business capacity enough to make a farmer, he had better study one of the professions.

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DISCUSSION.

H. ROBBINS—What is your preventive of dogs killing sheep?

MR. COLE—The first sheep I ever owned was killed by a dog and I never had one killed since. I bell my sheep with large heavy bells. The dogs don't like to make too much noise when in mischief and these bells enable us to hear the disturbance in time to get to the sheep and either drive off or kill the dog. Dogs have been among my sheep once or twice but generally got out before I got there.

SUPT. MORRISON—Can Merinos be kept in larger flocks than the mutton breeds?

MR. COLE—Yes, I guess there is no dispute on that point.

SUPT. MORRISON—Have you had any experience with crossing with any of the Downs?

MR. COLE—Some little experience. If I was going to cross I would continually cross in one direction. This undertaking to cross first with the fine wools and then with the coarse wools, trying to get all the virtues wrapped up in one hide can never be done either in man or beast.

J. M. TRUE—How large a flock do you think can be profitably kept in one enclosure during the summer?

MR. COLE—I believe the fewer you keep together the better. I don't know how many you could keep together if you had a sufficiently large pasture. But a few animals do better together than a great many together.

GEO. WHICHER—If you were feeding a flock of sheep what kind of feed would you use?

MR. COLE—If I was confined to one thing I would rather have clover than any other one thing. If I was confined to one kind of grain, I would rather have oats. But in my practice I feed a little straw and a little corn stalks, and a little hay, each thing at a stated time each day.

GEO. WHICHER—I was told by a gentleman that he had the best results when feeding cut up corn.

MR. COLE—I have fed that a great many times. Sheep like to run their noses into the husks and root out the corn. They will eat it better than when it is husked and thrown on the ground.

QUESTION—How about sheaf oats?

MR. COLE—I guess they are as good a feed as can be fed.

J. M. TRUE—Isn't there a great deal of waste in feeding sheaf oats?

MR. COLE—If you feed them all they will eat, they won't eat much of your straw.

GEO. WHICHER—Would you have them have access to water continually?

MR. COLE—At all times, if possible, though they will do well without water, if they have good succulent food. But there is no condition under which they will do as well without water as with it. They will live with snow, but it isn't as well as to have water where they can get right at it. I have water right in my sheep stables where they can run right to it.

WELDON VAN KIRK—How many pounds of wool ought a well-bred flock of Merinos to average?

MR. COLE—A good flock of Merinos ought to average eight pounds of good clean washed wool.

WELDON VAN KIRK—Do you advise washing?

MR. COLE—I don't advise it, only that it pays. For the good of the sheep I would advise not to wash.

GEO. MCKERROW—I would like to ask Mr. Cole if he has a flock of pure-bred American Merinos or high grades?

MR. COLE—When you get up into the sixty-fourths and one hundred and twenty-eights we call them pretty high grades, and we have got them right there in the town, that have sheared from seven to nine pounds. As to mutton sheep, if you are going to keep a sheep until it is three or four years old, there isn't a mutton sheep in the world that will compare with the Merino, but if you are going to sell them when they are six or eight months old the Merino won't touch some of the other mutton breeds. Men in our vicinity have gone into raising the mutton breeds and, without exception, it has been a failure. They wanted to huddle them up and keep them on the same food as Merinos, and they gaunted up so that it would make a man homesick to look at them; and the better you fill the Merinos the better they will fill your pockets, I can guarantee that.

A. O. FOX—There is one feature that we have not touched upon yet, which is quite important. I would like to ask what Mr. Cole finds to be the average percentage of increase in his lamb flock for the Merinos.

MR. COLE—There is a point where the mutton breeds are way ahead of the Merinos. If a man has got a hundred Merino ewes, and keeps them the way men generally keep them, and he gets 75 per cent. lambs, he does well. I have had as high as 75 lambs and never lost one but that is a very uncommon thing. Another point I keep in view is to breed from ewes that don't raise twins. A Merino sheep will only bring up one lamb and do well by it. A coarse woo sheep will do fairly well by them if you feed them well.

SUPT. MORRISON—What is the comparative value of the mutton from the Merino or from the Downs?

MR. COLE—In my opinion the Southdown is the best mutton sheep there is, because they marble their meat the best. The very poorest sheep that I ever butchered was a Cotswold, because they don't marble their meat. Short wool sheep are more apt to marble their meat than long wools. The Merino sheep, in my judgment, if well cared for, is equal to any other sheep except the Southdown.

Here is one point that has not been touched upon yet. Men that keep sheep are troubled with ticks. If you are troubled with ticks get some tobacco stems. There is a kind of poison connected with those stems that will kill the tick as quick as anything I ever tried. Set up a kettle and dip the lambs in the wash and in four hours you won't find a tick.

The man who keeps Merino sheep is in danger of trouble from foot-rot. They are more subject to that disease than any other stock I ever handled. I have cured it in my own flock and in in my brother's and in my neighbor's. I made a trough out of 2x6 stuff, twelve feet long, and fixed sides up to it so the sheep couldn't get out, and on one corner of this trough I ran a piece of gas-pipe which was connected with a tobacco pail outside, in which blue vitriol was poured as strong as it would dissolve. I poured it into the pail and it would come through the gas-pipe into the trough. I pared the sheep's feet off closely, and then ran them through this trough, with the blue vitriol in the bottom. You can have five or six in the

trough at once; and if you are thorough in never letting them step upon ground afterwards that they were on before this process, and clean out your stables at this time, and if you watch your sheep closely afterward, you will find this desease can be cured. Keep some of this preparation in a bottle and if you see a lamb with foot-rot, out with the bottle and apply the preparation.

GEO. MCKERROW—Wouldn't it be better to repeat this same process, after ten days or two weeks?

MR. COLE—I had 200 that I ran through in this way, and only 7 came around for a second treatment.

JOHN MARCH—How long do you have to keep them off the ground they have traveled on when diseased?

MR. COLE—I ran them through about this time of year. They got this foot-rot in the winter time and then they went on to the pasture. My brother let his go back onto his pasture again in the spring, but had no bad results.

J. C. MARTIN—How do you induce lambs to eat grain at weaning time?

MR. COLE—If I don't want to turn into a corn field I put some of my old tame ewes with my lambs, and I have a trough and put a little grain in there. You don't want to put in a great deal, a handful is better than a quart, and keep increasing little by little and very soon they will get a notion of eating. I never turn them into the corn field exclusively.

C. P. GOODRICH—I want to find out something of the profits of sheep raising. Can you give a statement of how much you can make on a flock of sheep in a year?

MR. COLE—I have about 200 sheep. I sheared this last year 187 sheep. My income from those sheep was something over $700. I have got my sheep on hand now and I have got my increase on hand.

C. P. GOODRICH—What is that increase worth?

MR. COLE—My increase and shearing produced some $850.

QUESTION—What will it cost to keep these sheep?

MR. COLE—I estimate that I can keep about eight sheep where I can keep one cow. I think that the feed I feed one cow will keep eight sheep well—it will feed more sheep if you feed your cow well.

GEO. MCKERROW—You want to remember that you keep the cows in the back-yard. Is that hardly a fair comparison?

MR. COLE—I keep my sheep in the front-yard. I have one I keep for a lawn-mower.

C. P. GOODRICH—It used to cost me $40 a year to keep a cow. If your sheep cost you in the ratio you mention, they would cost five dollars a year or the 200 would cost you $1,000.

MR. COLE—There is a difference in keeping cows. I keep my cows for ten or twelve dollars apiece. There is an indirect profit from sheep, that is way ahead of anything from any other animal—it helps to keep up your farm. On an eighty-acre farm you can keep two or three hundred sheep and raise as much grain as by not keeping them. There is where you make your profit.

PROF. W. H. CHANDLER—I do not think I can add anything to this discussion. I have never been a very successful sheep man myself, and yet there is no branch of farming industry that has interested me more than sheep husbandry, and I have watched with a great deal of interest and no little attention the efforts of men who have devoted their intelligence and their per-

sistent efforts to this branch of labor. I learned this in my observations: While I was laboring seven days in the week to just get a living raising wheat, my neighbor was doing the same thing in raising wheat and sheep and he had no more help than I had, and at the end of the year he had the profits of the increase of his flock, the profits of his shearing, and the profits through the year of an occasional addition to his table without a money expenditure. Now that I have observed all the way through, I do not see where the expense comes in very greatly in the keeping of a few sheep on the farm. It certainly does not come in the way of personal care. It does come in the way of using some of this land.

I have watched the operation of my son-in-law in this direction with much interest during the past few years. Now, this last year was not a very prosperous year among the farmers in our part of the state, the central part of the state, owing to the drouth. But that young man had a flock of 200 sheep on his farm of 240 acres. Some of his land is low and unfit for cultivation, and is not even tile drained, it has mere surface-draining. It is a very poor pasture for cows and but a very few cows could be kept in there, but his 300 sheep have occupied that 80 acres of land as a rule. He told me this year that the income from that flock of sheep was just about one thousand dollars; that is his wool and his sheep that he sold at a ready market at home for mutton, and his flock is just as good as it was a year ago. To my certain knowledge he has not paid out $50 to get this extra income of a thousand dollars. He has of course used that part of his farm for that purpose, but the tract of land wouldn't have kept near that number of neat cattle; that would have been impossible. This sheep industry has insured him and others like him a living. He is not at all a shining example of this. The neighbors, I suppose, could tell many better stories about that than I have about sheep. But I see his sheep have insured him an income right along, year after year, without very great variation, and so I conclude that there must be something in this sheep industry.

Supt. Morrison wishes me to narrate my early experience in sheep raising. When I first went upon a farm of wild land in Wisconsin in the fifties, I had to learn everything by hard knocks, and I am happy to say I learned a great deal. I had about 15 or 20 large bodied, coarse-wooled sheep. I had only about 40 acres fenced in, and the sheep ran out on the prairie, where they were a source of trouble to everybody except myself. I got sick of the complaints of my neighbors, and went to one of my neighbors who was apparently a shiftless sort of man. I said to him, My friend, I want to trade my sheep for your cow. It was a good looking cow. He said, I will give you that cow for your sheep. I said all right, and drove the cow home. This was in the spring early and in a few weeks my man had cleaned out the refuse in the cellar and the cow got out of the barn and ate the refuse and swelled up and died. My neighbor turned his sheep out on the prairie and time went on, he paying no attention to his sheep apparently, until in two or three years that man had a flock of 300 sheep worth a thousand dollars in cash. I thought he had the better of the bargain. This is one of the things I learned.



THE FLOWER OF THE FLOCK. From Breeders' Gazette, Chicago, Ill.

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# WHAT KIND OF SHEEP ARE BEST ADAPTED TO WISCONSIN?

By A. O. FOX, Oregon, Wis.

If it would be consistent with the title to my subject, I should like to have spent a good part of the fifteen minutes allotted me, in showing some of the many advantages which sheep husbandry has over other branches of stock raising.

**Sheep as Conservers of Fertility.**

The wonderful adaptability of sheep as recuperators of worn lands, spreading their rich top dressing, fine and evenly over the growing grass with no other labor than that of the flock while quietly grazing; and simultaneously adding to our visible supply of mutton and wool; the small expense of maintaining fences for sheep; light labor and expense of caring for large numbers; and the semi-annual interest received from the capital invested; these are points upon which I would like to dwell but to which I can only now allude.

The proposition which we are to discuss is what kind of sheep are best adapted to Wisconsin? To answer this it seems to me the questions for us to solve are: how can we market our feeds in the form of sheep products, in the shortest possible time, with a minimum of freights and other expenses; how shall we develop the wool and mutton bearing qualities to such an extent as will put on the back of each sheep, the greatest amount of the highest priced wool, that can be grown upon the carcass which will mature the earliest into deep heavy mutton, of the highest quality and flavor, and in the most compact form for economic shipment?

**Mutton and Wool.**

In other words we must have a combination sheep, through which we can afford to market our best foods in the form of mutton and wool.

How shall we go to work to produce this combination sheep is a question upon which many good sheep breeders will differ, each leaning towards the particular breed with which he has been most successful, influenced, perhaps, by local conditions.

But we must throw away all old notions which cannot be logically supported under present conditions. We must be alive to the forces with which we have to deal, the changes that are affecting our markets, we must produce what the consumers want, and for which the best prices obtain in the open markets.

We must look for the animal which is the best adapted to meeting these wants on a minimum of investments, and having found such animal, we must stand by him, whether he be "our hobby" sort, our daddie's, or somebody's else.

Nowadays, the tremendous energy of our people, the wonderful development of trade, the great rapidity with which ideas are executed, all lead to one great focal point, quick maturity.

The four or five year old steers are gone forever, as also the twenty months store hog; that sheep must go too, which cannot be properly fitted into deep, rich, nicely marbled mutton, at eight to twenty months of age.

The common sheep stock of the north-

west, from which we must select our breeding ewes are nearly all of Merino origin, some nearly pure and others graded more or less with the various larger breeds.

### A Cross for Profit.

For crossing purposes upon these ewes, to start with, I am in favor of using blocky, deep-set, high-bred rams of some of the recognized Down breeds, notably the Shropshire, Oxford, Southdown and Hampshire, my preference being in the order named. By the Down cross, especially the Shrop cross, we at once add from 35 to 70 per cent. to our average increase in lambs over the average of the Merino flocks, there are few flocks of Merinos that will average 90 lambs to the 100 ewes.

I heard one of our leading Wisconsin sheep breeders state at our recent agricultural convention two weeks ago, that his ewes averaged last season 75 per cent. of lambs. This corroborates my own experience with the same breed during a period of several years before we began using the Down ram for crossing. After the first cross of the Shropshire the percentage will raise at once to 100, and the subsequent crosses, if judiciously made, will bring it up to 130 and frequently higher, to 150 per cent. with a corresponding increased ability on the part of the ewes to furnish plenty of milk for twins, and to grow them in every way equal to single lambs. This one item of the increased lamb product is very considerable and is in itself sufficient to make the profit of a flock.

### Selecting the Ewes.

In selecting our ewes to start a flock, they ought to be of good depth and well sprung at the loins, with neck not too short, a thick-necked or chucky-chopped Merino ewe is no better breed than a sow with a short neck and deep, heavy jowl. A good brood ewe should be of proper proportions, plenty of length and depth, and good breadth over the loins, not leggy, and yet not chucky, small thin ear, strong head, and a nice clean feminine countenance; she should carry a nice, clean coat of close, even lustrous, fibre.

### What Kind of a Ram?

The ram should be the embodiment of compact substance, and strong masculinity, a head so strong and masculine as to be almost coarse, with a large, full determined eye. He should be near the ground, heavy in heart, broad and close coupled in the back and loins and must be particularly well carried out in the hip and flanks with a good, straight hind leg. His body, head, belly and legs should be well covered with a good close coat of even texture, but not too fine in fibre for a ram.

With this sort of a ram and the ewes as above described, under good management we are in a fair way to breed first class mutton sheep, which at the same time producing a coat of medium wool, second to none, valuable at once for the splendid protection which it furnishes the sheep, its high combing merits and light shrinkage in the hands of the manufacturers, its freedom from noils in the weaving, and the popularity and durability of the manufactured goods.

But to decide this question of wool let us investigate what kind of wool had we better grow, for what sort is there the strongest demand, where does it come from, and how many will be able to supply it?

### An Object Lesson.

In order to present to you the facts on this wool question in an acceptable light

and to avoid dry statistics, and political color, I have prepared this little case of wool samples from which we may easily see the relative value of each kind, their prices in the market, and the manner in which each kind may be grown by the farmer.

In order to obtain an accurate basis upon which to place my classification, I wrote to Mr. J. C. Hill, wool merchant of 192 Kenzie St., Chicago, requesting him to send me a sample of each kind of wool as classified on the Chicago market, attaching to such sample its classified name according to the grade of wool to which it belonged, and its then Chicago market price.

These wool samples, their names and their Chicago value are all placed in the right hand column. In the left hand column opposite each of these Chicago samples I have placed other names of like quality, selected by myself. Under each sample of this lot I have printed a history of how the sheep was bred that grew it. Under this again are samples of the manufactured goods, showing the kind of products that each kind of wool enters most largely into.

This wool is all unwashed and the prices are for the unwashed article. Now we will examine these Chicago samples, this first sample is classified as carpet and braid wool, the price sixteen cents to twenty cents.

It is undoubtedly a fair sample of Cotswold as you will see by the corresponding sample. The next sample is called "Quarter block combing," price 24c. to 26c., this goes to make cashmeres and tweeds. The sample to match this is a Shropshire-Cotswold-cross breed, the sample is of seven months' growth. It was grown by one of my patrons in Iowa and sent to me with a history of the sheep from which he clipped it. The next sample is termed "three-eighths-blood medium," price 27c. to 50c., it is a little finer in texture than the "quarter-blood-combing-wool.

It might be found in a flock bred the the same way as the preceding or by Shropshire-Leicester cross which produce an elegant staple like this sample. Here is a nice illustration of what selection may do in a flock.

Here is a sample of pure Shropshire of eight months' growth, which almost exactly matches the Chicago sample of ⅜-blood medium. It is four inches long, fine in fibre, bright and lustrous. The next is "half-blood Delane," price 27c. to 30c., that is a still finer fibre than the ⅜-blood medium. There is a little more Merino to this without the gum. While very fine and silky its shrinkage is considerably less. The corresponding Shropshire-Merino cross of seven months' growth; it is three and one-half inches long, very fine in fibre, lustrous and oily, and has not the heavy yolk of the pure Merino. This is a very profitable kind of wool to raise. The next sample is a "Fine Merino," price 20c. to 25c., and I do not consider it a fair sample of Merino wool. It is as far as fibre is concerned, but it is hardly long enough to be classed as a good sample. It has the characteristic heavy gum of the Merino.

It is readily seen here that there is a great difference in the market value of these various grades of wool in favor of the fine, close, lustrous medium staples three to four inches in length, the difference amounts to between five and fourteen cents per pound in favor of the medium wool.

Now in regard to the amount of our supply of this high priced medium wool, I find by the reference to the statistics of Lynch, of New York, and Bond, of Boston, that we are producing about

thirty millions pounds of the medium wool annually and that we are importing annually under the head of this medium wool over thirty million pounds of this same class.

Then under the heads of cheaper grades of wool, quite a good deal of this medium wool is imported to escape heavy duty.

**We are not Keeping Sheep Enough.**

Under these circumstances, with such a premium paid upon the wool, we are not producing half that our mills demand, and this in the face of a much greater demand for the kind of clothing that medium wool makes.

Now friends, why don't we here in Wisconsin put in the necessary medium wool sheep and grow that other thirty odd million pounds of medium wool, instead of obliging our manufacturers to import it at over forty per cent. duty?

Where on earth are there finer hillside sheep walks, all over this beautiful state? Where finer water privileges, where better facilities for feeding and marketing?

Yet look at our state statistics: Wisconsin owns but a paltry 700,000 sheep, while low and sandy Indiana bobs up with a million and a half, Michigan two and one-half millions, and Ohio over four million sheep. Also note the prices that these last two states get for their best medium wool.

Where does Wisconsin wool stand as a class in the open market? It is a fact that the choicest of mutton and the highest priced wool can be produced on one and the same sheep. We can utilize our feeds to the very best advantage, growing two of the highest-priced products. We have it within ourselves, here in Wisconsin, to supply the greatest amount of all the fancy mutton required by our tributary cities—Chicago, Milwaukee, St. Paul and Minneapolis—and on the backs of these very same sheep to grow the other thirty million pounds of medium wool that will command almost any reasonable price we might ask, just as soon as we can learn to grow it intelligently, to do it up honestly after shearing, and to place it upon the market in an attractive form and a business-like manner, all plainly labeled, Warranted *Double X* Wisconsin Medium.

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DISCUSSION.

H. ROBBINS—What would you cross with the Leicester full-blood to make the best mutton and wool sheep?

MR. FOX—I think with any of the recognized Down breeds; any animal which was selected from among the recognized Down breeds would give you good results. I know that to be a fact. As to my own individual preference, I prefer the Shropshire, for this reason, he is neither the smallest nor the largest; he is medium in size, and is wonderfully hardy, as has been shown by their being kept in thousands in England, where sheep are subject to tuberculosis. I believe that in making any cross the sire should be of a compact, strong constitution.

H. ROBBINS—How would the Cotswold do?

MR. FOX—I can answer that question no better than to quote the report made by the commission appointed by the Chamber of Agriculture, of Great Britain, some five years ago to investigate as to the various breeds of sheep. That commission reported, after having traveled over various districts, examining sheep and testing a great many on the block. Their report to sum it up in

short metre, was, the best mutton sheep they declared to be the Southdown, the next best the Oxfordshire, then the Hampshire, the Border Leicester next, Lincoln next, and, last of all, the Cotswold. Now, that is the best answer I can give for that.

SUPT. MORRISON—In the southeastern portion of the state we have a great many of the Spanish Merino grades; what cross would you recommend upon those flocks?

MR. FOX—I would recommend the use of Shropshire or Oxfordshire rams on those ewes.

H. ROBBINS—I crossed first the Southdown and then the Lincoln with the Leicester. I crossed witn the Southdown and then with the Lincoln on to that.

GEO. MCKERROW — Did that make pretty good hash?

H. ROBBINS—Their wool averaged six or seven pounds and they were splendid mutton.

W. H. COLE—Would you advise crossing for mutton or would you breed right along in one direction?

MR. FOX—I think that in order to get anywhere we have got to have an objective point before we start, and therefore if I was to cross in breeding for improvement, I would like to lay out a line of action and stick right to it. In this subject we have under discussion, that of grading up the common stock, I should prefer taking any of the Down breeds and stick right to that breed, until you have got just what you want. This running all over for sires from one breed to another makes hash, and it is worse than boarding-house hash.

MR. MCCLOUD—What would Shropshire sheep average apiece?

MR. FOX—I have had a flock of Shropshires for the last fifteen years, and they never averaged less than seven pounds unwashed. That includes the yearling sheep, that is lambs carried over, as well as the brood ewes. In order to produce a heavy growth of wool it requires heavy feeding. That the Shropshire is a good wool grower is amply shown by the evenness with which he grows his wool.



# BEST METHODS OF BREEDING, FEEDING AND MARKETING MUTTON SHEEP.

By GEORGE McKERROW, Sussex, Wis.

This subject has been pretty well traveled over. You will pardon me if I re-travel some of the ground. First, let us take up the subject of breeding mutton sheep. I will say, first, that the breeder of mutton sheep should breed for the best and should be satisfied with nothing short of getting the best. By this I mean to breed for a class of animals that have in them the traits of early development, quick growth, the best quality of mutton, so that they can turn the food consumed to the best advantage, thereby giving us the largest profits.

### The Mutton Sheep.

Now, I agree with my friend Fox, that in the Down breeds, as they are called, we have the breeds that we must look to at present time, for the production of this high class product, an early maturing sheep. He has mentioned the different breeds I would, having experimented with them all, for early lamb production, choose one of the larger breeds, the Oxford or Hampshire. It is claimed for the Hampshires that the mothers are the best milkers and will produce the heaviest weight lambs at an early age. But that breed lacks the form that we like to see in a good mutton sheep. They are the most rangy of any of the Down breeds, standing higher, not being as well formed or as well developed in those places where we find the high priced meat, the loins, chops and rounds. They are coarser, have coarser bones and have longer necks than the Oxford, and I therefore have a preference myself for the Oxford for early lamb production. If further back from the market, necessitating the putting of lambs on the market at from eight to tem months or from six to twelve months, I might say that then there would be little choice between the three breeds, Oxford, Shropshire or Southdown.

### An Experiment.

Last year I weighed the meat from the three breeds; the Oxford lambs gave an average of 118 pounds each; they were born in March and weighed in August; the Shropshire lambs averaged 100½ pounds each, and the Southdown lambs averaged 101 and 1-3 pounds each. This shows you that the Oxford makes the most rapid growth, which is the reason why I should choose that breed as an early lamb producer. This matter of early maturity in these Down sheep is somewhat questioned by the breeders of other classes of sheep. The reasons that I have for naming the Down as the producer of the best quality of mutton are that in looking over the dressed carcasses at the fat stock shows in Chicago for the last three or four years, I have noticed that the Down carcasses were covered on the outside with lean meat, and when the meat was cut through they showed the marbled meat that is so highly prized by mutton eaters of this and all other countries; while other breeds, particularly the long wool breeds, bunch the fat upon the carcass;

upon some of their carcasses you will find large bunches of fat upon the rump as large as your fist and larger, without any outside covering of lean meat. We find in the Chicago markets right in the yards that the carefully bred Downs bring the best prices.

### The Downs Topped the Market.

A carload of Oxford and Shropshire lambs shipped from our county in the month of December topped the Chicago market the day they were there at $6 a hundred. Those lambs averaged 97 pounds each and netted the shipper $5.73 per head. On the 19th day of March last I noticed a sale in the Drover's Journal of 194 grade Shropshire lambs, average 106 pounds each, which were sold at $6.85 a hundred, which topped the market for that week.

### Gilt-Edged Mutton.

Now, if we are going into the mutton business it will be almost impossible for the average farmer to buy a good-sized flock of pure-breds of these different breeds, as they are selling at large prices. But by the selection of a good flock of large, roomy, grade ewes, from two to five years old, and the selection of a pure-bred sire of any of the breeds that we have mentioned, the farmer can start in and produce gilt-edged mutton. The thing he must do is to hang up before him the motto of early development. It takes young pork to bring the fancy price and the lamb to top the sheep market. The earlier that you can put the lamb upon the market the greater are the profits compared with the food that he has consumed.

### Care of the Flock.

The sheep requires but little care, but that must be given at the right time or you will find loss resulting from the lack of it. We should begin to feed the flock well in the fall, keeping up an even growth and development; the moment that we allow a flock to run back in condition, the wool stops growing, they begin to lose mutton, the digestive organs begin to get out of condition, and though we may feed the flock highly after that through the winter, they will not recover from the bad effect of starvation in the fall. In the spring of the year we are apt to make a mistake in turning them out upon the grass again, and again we lose in mutton and wool and in the lamb crop, and in the growth and development of the lambs afterwards. When this flock is shorn and the secondary product of sheep breeding is offered to the buyer and he draws out staples from the different fleeces and stretches them between his thumb and finger, they will part, showing where the sheep was starved and the wool stopped growing, and we must take from two to four cents a pound less for the wool than the neighbor who has fed his flock well and evenly through the year. The manufacturer is not to blame; he cannot make good goods out of rotten wool; the feeder is to blame.

A breeding flock should never be made very fat, but should be kept plump and round. Many Merino breeders when they have begun to make mutton sheep have made a mistake in this direction. When a Merino sheep is in good condition it doesn't show it like a mutton sheep does. It doesn't naturally have that rotundity of form, and the man who has bred Merinos is satisfied if his mutton flock looks as well or a little better than his Merinos did, not taking into consideration the fact that they are rounder and should show better than the Merinos. Men who have tried Merinos are very apt to feed too light and to be

satisfied with too low a condition of the flock.

**Special Care of the Lambs.**

When the lambs are born special care should be taken to force them along in their growth. As I said before, the mothers should be well fed, fed upon succulent foods, milk producing foods, so that they will be ready to give the young lamb a good supply of nourishment. Then when the young lamb is old enough to take extra food a part of the pen should be partitioned off with a sliding gate; we make ours of six inch fence boards, running up and down eight inches apart. We let this down and keep it clean and the small lambs will soon learn to go in there. Then I put in a trough standing up about six inches above the ground, with a rail to prevent the lambs from getting into the trough. Into this trough I put some grain—I prefer ground oats, and the lambs will soon learn to eat and will do uncommonly well. They don't eat a great deal but what they do eat they turn into a good price for your grain, continue this feeding, feed the mothers and the lambs very well, until there is a good bed of grass, and then they may go to grass, and then if you have got a mixed pasture on high land, by which I mean access to clover, timothy and wild grasses, blue grass, white clover, etc., and plenty of water, your flock will get along very well, but if there is a shortage of pasture, continue the grain feeding of the lambs. In this way you can force along a lot of well-bred lambs so that at five months old they will average from 80 to 100 pounds each, and will bring you in the Chicago market at least $6 per hundred.

The question of foods is often brought up. In fattening sheep that are matured, corn comes in as one of the cheapest and best rations, but if we are going to make a gilt-edged article of first-class mutton then we must use in this connection, succulent foods and more nitrogenous foods.

**Cornell University Experiment.**

I will quote in this connection an experiment made at Cornell University in the state of New York, during the winter of 1878–9. A few common lambs were bought at the station in the month of November, and they were very common lambs, only weighing from 36 to 50 pounds each. They were shorn in November and put into the trial experiment on the 25th day of that month. One lot was fed a nitrogenous ration, composed of clover hay and bran and cotton seed meal, with a few roots to keep them healthy. The other lot were fed a carbonaceous or fat-forming ration, composed of timothy hay and corn, with a few roots. Six months later the results of the experiment were summed up. The lambs fed on the nitrogenous food had produced mutton at a cost of $6.03 per hundred, while those fed upon the carbonaceous food had produced mutton at a cost of $7.59, showing a balance in favor of the nitrogenous foods of $1.56. Remember that these were young and growing lambs and needed more of the muscle and bone-forming elements than older sheep would have needed.

Then in regard to the advance of succulent foods another experiment was carried on at the same place and same time. One lot of lambs were fed upon hay and grain, having as much as they would eat up clean, and a ration of roots; while another lot was fed upon the same kind of hay and grain, having as much as they would eat up clean, but without the roots. It was found in summing up at the close of the experi-

ment that those lambs that were fed roots had eaten twenty cents worth of roots; they had also consumed fifteen cents worth more of hay and grain than the other lot, but the lambs that were fed the roots had produced $1.17 worth of mutton more, than the lot not fed roots. In other words, an outlay of thirty-five cents brought back $1.17. It is a recognized fact that we cannot produce gilt-edged mutton without the use of these succulent foods. The Englishman appreciates that fact, and they understand it over in Canada full well, where there are some of the best sheep feeders in this country. There are men in Canada who make a practice of raising gilt-edged mutton and sending it across the line, paying the twenty per cent. duty, and still selling it in our large cities at a large profit. Now, if farmers up here in Wisconsin, in the same latitude as Canada, where we can grow the same classes of food that they grow there would turn our attention to producing gilt-edged mutton and put it upon the market, we could have some of that money now going across the line into Canada brought here into Wisconsin.

The question is sometimes raised as to whether we would not glut the market if we all went to producing first-class mutton. I have no fear of us all going into it, but to show you there is no fear of glutting the market with this kind of meat I will state that in the fall of 1888 I stayed four or five hours with the buyer of a Boston dressed meat house, who was buying up the surplus at the Chicago stock show; I asked him this question: How many of those sheep such as you have got here could you buy in a week? He said, I would buy 4,000 of them at the same price, if I could get them. The price was $7 a hundred. He says, we can't get near the amount we would like to get. He said there was no fear of over-stocking the market with this kind of mutton.

#### Some Drawbacks.

But it is not all plain sailing in the sheep business any more than in any other business. There are the parasites such as the liver worms and lung worms to be contended with. A very good recipe for dealing with ticks is the one given by Mr. Cole, that is, dipping in tobacco water. As to parasites I have found that by keeping salt, with a fourth to a tenth of sulphur in it, in troughs where the sheep can get at it, that I have no trouble with parasites. This may be due to keeping the flock in good condition, but I have noticed that sometimes in wet seasons while my neighbors are having trouble with their sheep I haven't had any. Sometimes in the fall of the year, after weaning the lambs, when we have a wet fall with a good deal of soft grass I find that the lamb flock will begin to scour, and the best remedy I have found for that is common white flour mixed with the grain ration.

The largest profits are made from putting young sheep on the market. You get from a dollar to two dollars a hundred more than for aged sheep, and you can make mutton cheaper on the young sheep than you can on the old ones.

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### DISCUSSION.

J. M. SMITH—At what price would gilt-edged beef have to be sold to secure equal profits with gilt-edged mutton or lamb?

MR. MCKERROW—I claim that I can produce a hundred-pound lamb, not taking the wool into consideration at all, but simply the meat, as cheaply as I can

produce beef on the fifteen-hundred pound steer.

SUPT. MORRISON—What is the best ration for breeding ewes?

MR. MCKERROW—The best ration for breeding ewes with me I think is clover hay twice a day, straw, as much as they want to pick over in the yard the third time and a ration composed of equal parts of bran, oats and corn. If I am short of clover hay and have to reduce the amount of clover hay fed and feed some timothy or corn fodder, then I take out the corn almost or entirely; and I give a ration of roots.

J. D. JONES—I would like to know if the Oxford Downs are considered the best mutton.

MR. MCKERROW—That question is a hard one to answer; so far as the mutton quality is concerned the Southdown I guess is recognized as the best, but its size is somewhat against it in popular favor. Then the Shropshire comes between the Southdown and Oxford, the Oxford being somewhat larger, and its friends think that it is a better producer of the early lamb, as I stated in the beginning.

H. ROBBINS—It is very easy to get rid of mutton lambs, but how do you get rid of old sheep?

MR. MCKERROW—The ewes we wish to cull out of our flock we find no difficulty in getting rid of; we cull them out, sometimes fatten on the grass, sometimes late in the fall and sometimes later in the winter, and we have no trouble in getting from $4.50 to $6.

SUPT. MORRISON—To what age do you find it profitable to keep the ewes?

MR. MCKERROW—The mutton breeding ewe has her most profitable time between 2 and 5 years old.

WELDON VAN KIRK—At how early an age do you have the ewes drop their first lamb?

MR. MCKERROW—At two years.

THOS. CONVEY—Is there much mischief done by exposing sheep to cold rains and damp quarters?

MR. MCKERDOW—I believe I have lost as much in my flock by a cold rain before I knew enough to house them, as I have gained by a month's feeding afterward.

SUPT. MORRISON—Have you any system of registration?

MR. MCKERROW—Yes, we place a private ear-tag in the ear of the lamb. I have a regular record with pages and columns. In the first column is placed the name of the sire and dam, with their ear-tag numbers and the record numbers of their record in the acknowledged record of the Shropshire association's record, the Oxford record, the Southdown record, where most of my sheep are recorded. Then when an animal is born he is given an ear-tag, and his ear-tag number is placed in the proper column, or if twins two numbers are placed there; then when placed in the breeding flock they are placed on the proper page, and so on.

W. H. COLE—How old are the lambs when you put the tags in?

MR. MCKERROW—We have to put them in when the lambs are about two weeks old, and it requires special care then to sort them out and see that the ewes have their own lambs.

W. H. COLE—Do you have any trouble with the ear-tag working down into the ear of the sheep?

MR. MCKERROW—I do not; I have had them torn out.

THOS. CONVEY—Will a sheep eat when it is dark?

MR. MCKERROW—Well, I believe it is a pretty poor time for them to eat. They

should not be fed earlier in the morning than sunrise and they should be fed in the afternoon so as to have them through eating by shortly after sundown or about sundown.

QUESTION—Don't you think they feed considerable in the pasture before sunrise in the morning?

MR. MCKERROW—But I am speaking of feeding in the winter.

MR. O'NEILL—How much does it cost to produce mutton?

MR. KERROW—A flock of sheep get a part of their living on the farm without much cost; they are good gleaners through the stubble fields after harvest and good scavengers and browsers, and take a part of their feed from the weed and bush that they meet in their way, so that it is pretty hard to figure, unless we make experiments.

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# EARLY LAMB RAISING.

By R. C. JUDSON, Farmington, Minn.

**A Promise.**

In an unguarded moment I promised to write you a paper on the subject of raising early lambs for market. Now, if there is anything I dislike it is to prepare a paper upon any subject, but as I have promised I will endeavor to keep my word.

I shall not give you the history of my ups and downs in sheep raising in Minnesota for fifteen years, and I shall not speak upon the merits of the different breeds, all of which, or rather the most of them, I have my private opinion.

I realized a few years ago that there was a good market for early spring lambs in St. Paul, and that the large hotel clubs and restaurants were getting their early spring lambs from Chicago and paying a good round price for the same, and I resolved to furnish that mutton, or at least a portion of it.

**Read and Keep Posted Up.**

I read all the literature I could secure on the subject and made my own experiments and here they are in a nutshell.

First, I secure after shearing the largest and best high grade ewes that I can pick up. I get them from one year up to four, dip them all so as to kill all ticks and parasites, tar their noses on account of the fly and turn them into good pasture. Keep them thrifty until August, when I have a new pasture to let them run in, get them up to the yard nights and give them a little grain, increasing the allowance until by the tenth day I am feeding a good winter allowance (the grain I feed being oats). This will soon bring the ewe around for service. July 1st I put up the bucks I intend to use in the barn away from all noise of the bleat of the sheep. I commence with a small grain ration and all of the good clover hay he will eat, increasing the ration of grain until each eats his pint of oats three times per day, and at time of service I have a good vigorous ram and his vigor will show itself in his progeny. After the ewes are through with their feed I turn one of the rams in with the flock and allow him to

serve only one ewe when he is taken back into his pen in the barn and another is brought out if more than one ewe is to be served. In the morning the service is repeated and again at night and the same pains is taken until all of the ewes are served, keeping record of each ewe served. After all ewes are safe with lamb the grain feed is gradually withdrawn and they are kept on grass until late in the fall when I commence feeding bran and feed bran up to the day, and for two or three days after each lamb is dropped, when I commence feeding oats with the bran, feeding as is necessary to furnish a full flow of milk.

### Clover Hay.

I feed my clover hay (which by the way is the only hay fit for sheep), on the ground in the yard. I have one-half acre yard enclosed with a good board fence, and straw, hay and corn-stalks in stacks built against the fence' except the north end where my shed is. My object is to shut off absolutely all wind, which is what kills the young lambs. I feed my sheep next to the fence all around the yard, putting the hay up against the fence. By feeding this way you require the sheep to travel backward and forward, in fact a sheep in eating hay this way hardly stops long in a place, and as I want my sheep to get plenty of exercise, they get it by hustling for their hay; and right here I will say that I think plenty of exercise, salt, with sulphur and bran, is just what a sheep needs. The bran keeps their bowels open, and hardly a sheep treated this way is feverish during lambing. I have discarded all warm barns for lambing, and, I prefer the open yard provided, of course, it is not storming. Of course I want the yard protected from winds. The best lambs I had, dropped in my yards with the thermometer 15 below zero. Out of 83 lambs dropped in the yard with the thermometer below zero, I only lost three and two of them were twins.

I found out to my sorrow that keeping ewes shut up in warm pens during lambing I lost 40 per cent. of my lambs and not unfrequently a few old ones.

### Care of Lambs.

After my lambs are old enough to begin to eat grain by themselves, I make a little pen adjoining the one where the mothers are kept, and cut a hole through large enough to let the lamb through and feed them ground corn, oats, bran and oil-cake, and give them all they will eat up to the day they go to the block. I market my lambs dressed in St Paul, and get 20 cents per pound dressed from March 15 to May 15. Of course I have them dressed nicely, well trimmed and sewed up in good cotton cloth. My object is getting them to the market in first-class shape, as it is almost impossible to sell any dressed meat or poultry that is bloody and dirty, and placed in the market in a slip-shod manner. I commence shipping my lambs when they will dress 30 to 35 pounds. Now, right here let me advise all who intend to butcher lambs, to butcher them as soon as taken from their mothers, as a lamb will bleat himself poor in a day. There is much more that might be said in lamb raising, also in selecting the ewes, diseases that sheep are prone to run across, and trust some day that I may meet with you and then we can compare notes. I will close this by saying that the high-grade Cotswold ewe and the Shropshire ram is what *I* like, and the nearer full-blood Cotswold ewes you get the better.

# EDUCATIONAL SESSION.

## SMALL FRUIT GROWING UPON THE FARM.

By J. M. SMITH, President Wis. State Horticultural Society.

### Strawberries as Cheap as Potatoes.

I do not appear before you this evening for the purpose of selling you trees or plants. I firmly believe that nearly every farmer in the state, can, and ought to have a full supply of small fruits for the entire year. My object is to try to convince you of that fact, and then give you a few directions as to the best varieties, methods of cultivation, etc. I shall not tell you that you can raise a bushel of strawberries as cheaply as you can a bushel of potatoes, as I do not believe that you can do so. Neither shall I tell you that you can raise 500 or 600 bushels to the acre, as I do not believe that either. I shall not tell you any unreasonable stories of any kind, so please give me your attention for a short time and I will try to convince you that you will add very much to the value, as well as to the comfort and happiness of your homes upon your farms, by having a full supply of desirable small fruits.

Let it be remembered that although we cannot yet boast of a general and complete success in growing apples and pears, there is no state in the Union, that can show a finer record in the yield of small fruits per acre than can Wisconsin. What then about soils? I prefer a rather damp, sandy loam, but if this is not to be had, let it be remembered, that any land that will grow a good crop of corn or potatoes, will grow a fair crop of strawberries, raspberries, blackberries, currants or grapes.

Another thing to be remembered is that any manure that will make corn or potatoes grow will make the above named fruits grow. As to the amount of land needed to furnish a supply for your families, it is safe to say that every square rod of land devoted to strawberries, and fairly well cared for, will give you at least one bushel of nice berries. Raspberries and blackberries will yield about two-thirds as much as strawberries; currants should yield at least four quarts to the bush, and grapes at the rate of at least three tons per acre. These are all very moderate yields, and you may easily estimate from them the amount of land you will require to furnish a generous supply for your family.

### The Strawberry.

We will speak first of the strawberry. It is well to manure the land for this fruit, even if it is in good condition. It should also be so well drained that no water can stand upon the beds. In short, put it in as good condition as you would if you expected to raise on it 100 bushels of shelled corn or 250 bushels of potatoes per acre. As to varieties most desirable to set, I will say, if the Wilson does as well in your vicinity as it does about Green Bay, I truly believe that you will get more fruit from it than

from any other strawberry plant in existence. It has a perfect blossom and needs no other near it as a fertilizer. Next to the Wilson with me comes the Manchester, and the Crescent. These last two named are both pistillates, and need some perfect flowering variety among them in order that they may do their best, or even fairly well. I have used the Wilson as a fertilizer by setting about one-third of the plants of this variety.

**Go Slow Upon Novelties.**

As to giving any advice in regard to to the hosts of new varieties, I will only say that in my opinion, the slower you go upon them the better it will be for your purse, and also for your peace of mind. Let the professional growers test them thoroughly, and when any really good variety is produced, the public will soon be made acquained with the fact, and you will be less likely to waste both your time and money. If you decide to set Wilson, and wish, as you probably will, to cultivate with a horse, mark the rows not less than three feet apart, and then set the plants 12 or 15 inches apart in the rows. In setting be sure to press the earth firmly about the roots of the plants, and if the weather is dry, give them a thorough watering. If you set the Crescent, the Warfield No. 2, or any other of these very strong growers, make the rows four feet apart, and set the plants 18 inches apart in the rows. Keep down all weeds and grass by cultivation, and go through them when in bloom and clip off all the blossoms so as to throw the entire growth into the plant during the whole of the first season. After the ground is frozen in the fall go over them with marsh hay and cover sufficiently to hide all the leaves, and leave them until spring. Straw is equally good for covering if it has no foul seeds to grow and choke the plants in the spring.

**A New Bed Every Spring.**

I find it better, and I believe quite as cheap, to set a new bed every spring, as the weeds and grass will come up and annoy you in the old bed; and even if you succeed in keeping them down for two or three years, the fruit is not quite as fine nor the yield as large as the first year. In selecting plants for setting I make it an invariable rule, never to set plants that have borne fruit. Be sure to have young and thrifty plants of the last season's growth, and do not set any others even if they are given to you. Leave the covering on in the spring, until all danger of hard freezing is past, and the young leaves are beginning to start. When I have followed this plan, I have never once had the fruit damaged by late frosts. It will be two or three days late in ripening, but the crop is almost a certainty. After taking off the covering I put on a dressing of fine manure, or what I like better, wood ashes, at the rate of half a bushel to the square rod, keep down the weeds, and in June and July, pick a fine crop of this queen of all the small fruits.

By following these few rules, I have not failed to have at least a paying crop in twenty-five years. The yields per acre have as a rule, been much larger than the amount I have named, as within reach of nearly or quite every farmer in the state.

**Raspberries.**

Give them the same kind of soil as the strawberries, and the same kind of preparation. For varieties I have never tried any that I like as well as the following: The Marlboro for the first early red, and the Cuthbert for the late red; the first named is with me a large and

beautiful berry, and begins to ripen before the strawberries are gone, I believe we have never failed to have them both upon the table at the same time since the Marlboro came into bearing, though we do not consider them quite equal to the Cuthbert in quality. The Cuthbert is a large late berry excellent in quality and very productive. Among the blackcaps the Souhegan is nearly as early as the Marlboro, a good bearer, and of good quality; the Gregg is a large late berry, and with me an excellent bearer of fine fruit. If you wish a few yellow ones take the Golden Queen.

The above named will give a good supply of choice fruit from the beginning to the end of the raspberry season. In setting, the ground should be furrowed, making the rows not less than seven feet apart; then set the plants two feet apart in the rows, press the earth firmly around the roots and water, if the weather is dry. I always grow some other crop between the rows the first season.

**Protect by Covering.**

In the fall, and before the ground freezes, they should be laid down and covered with earth. In covering, if we wish to lay the plants towards the west one man takes a hoe or a common four-tined potato fork, and digs out some of the earth upon the west side of the plant; then another follows and bends the plant over towards the west until it lies nearly flat upon the ground; another follows and throws a shovelful of earth upon the tips of the plants to hold them in place, after which they are covered about one inch in depth. When danger from freezing is over in the spring, they are uncovered and raised up as near their natural position as convenient and the earth is again replaced where it was taken from in the fall. Then put on a dressing of manure or ashes and cultivate well and thoroughly. All weeds and grass that grow in the rows must, of course, be destroyed with the hoe. You will not get a full crop the second season, as you will of strawberries, but you will get some nice fruit. As soon as you are done picking the fruit, go through and cut out all the canes, as raspberry and blackberry canes never bear but one season; also, cut out the weak ones of the new growth, leaving only a sufficient number to have a good crop of fruit the following season. After this is done we go through with a pair of large shears and cut off the tops, leaving them about four feet high.

I am not sure that this is the best known way of trimming the bushes, but it is a very cheap and easy way, and I get large crops of fruit while practicing it. The red varieties propagate by suckers, and will always give you many more than are needed, which surplus must of course be destroyed the same as any other weeds. The blackcaps do not sucker, but propagate from the tips of their branches. Should you need new sets, go among them in August and bend over some of the branches of the strong thrifty canes, and throw sufficient earth upon the tips to hold them in place, when they will take root, and the following spring will furnish you with nice plants for setting new beds. My oldest bed of Cuthberts, some seven or eight years old, never promised better than this spring. The cultivation of blackberries is so similar to that of the raspberry, that I need not repeat what I have said. They need the same winter protection, and given in the same way, and if well cared for will last longer than the raspberries. During the last five or six years, a great deal has been

said and printed in praise of the dewberry, or in other words, the running blackberry. I have been spending some time and money upon them for a number of years past, and if I had received one dollar per quart for all the berries that we have picked from them, I should still be some money out of pocket. I have already dug up a portion of them, and the balance of them will soon follow unless they do very much better than they have done.

### Grapes.

The cultivation of grapes is so easy that I will say but very little upon the subject. We set the vines eight feet apart each way. They are trained upon a trellis, posts being set about 12 feet apart, and smooth wires stretched upon them.

We trim them in the fall, cutting the branches of the main canes back to two or three buds each. We then lay them down and then cover them with earth one to two inches deep and leave them until we think danger from frost is past. The Concord has long been the grape for the masses, and is still more generally cultivated than any other variety. Sometimes the season in the northern portion of our state is too short for it to do its best. With me the Moore's Early, Worden, and the Massasoit are all from one week to ten days earlier than the Concord, and the two last named are, in my opinion, much better in quality. I would not advise any one in this state to plant any grape that is later than the Concord in ripening, as there are a number of good varieties that I have not named, that I believe to be not only earlier, but better in quality, though I have not yet tested them sufficiently on my grounds to speak confidently of their merits.

### Currants.

The currant is a northern fruit, and absolutely refuses to do its best in a southern climate. There is no fruit grown with us, that will bear as much neglect, and still have a small amount of fruit as the currant. Neither is there any that will respond more quickly to first-rate care and cultivation than this fruit. It is the only one of our garden fruits that will endure our most severe winters, and come out in the spring without a damaged bud. It is more than thirty years since I set the first currant bushes in this state, I have never given them any winter protection, and have never yet seen a bud damaged by cold. We set the bushes six feet apart each way, manure heavily, cultivate thoroughly and always secure a heavy crop.

For table use, it is doubtful if there are any better varieties than the old red and white Dutch. For other purposes, my wife thinks she has never used any that were equal to the Prince Albert and the Long Bunch Holland. They are much larger than the last named, and with me yield a much larger crop. We let from four to eight canes grow in a stool, and after they have borne a few years we cut them out and allow the strong young canes to take their place. In this manner they may be kept in full bearing for many years.

### To Destroy the Currant Worm

We use White Hellebore, putting about half a tablespoonful into a ten-quart pail of water, and then sprinkle on a sufficient quantity to fairly wet the leaves. Its use will not injure the fruit or those who use it in any manner.

We trim the bushes any time in the fall after the leaves have fallen from them. I

have in this brief manner given a few rules which if followed to a reasonable extent, and then supplemented by the good sense of our farmers and their wives, will, as I believe, enable forty-nine out of every fifty of them, to have a full supply of all of these delicious fruits, not only during their season of ripening but also canned, or otherwise preserved during the entire year. The comforts and the happiness that may thus be added to our homes, is only known to those who have had a bountiful supply of them all. If among the many thousands who will doubtless read the Bulletin report of this closing institute, there are a few who will make a faithful and persevering effort to follow out the recommendations here given to supply themselves with small fruits, I shall feel that my efforts in preparing these remarks have not been in vain.

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# THE GOOD FARMER AND THE POOR FARMER---A CONTRAST.

By MRS. J. A. CLARK.

I propose by a few instances and examples to make a contrast between the good farmer and the poor farmer, and to show by their works their utterly different ways of doing things.

### Care of Tools.

The good farmer takes care of his tools. After haying you will see him take his scythe and his rakes up to the top of the hay mow, so as to have them in a safe out of the way place, and fasten them up under the ridge pole. Next summer the scythe falls down on his head and cuts a slice off of one of his ears, and when he wants the rakes, he has to knock them down with clubs. The poor farmer leaves his scythe in a tree, and a man steals it, and he hangs his rakes on a fence and his wife gets them to rake the door yard with, and by the first of October, there won't be a tooth left in any of them.

### Good, Convenient Buildings.

The good farmer may be known by his buildings. he has a three-story pig pen, and when a hog gets out, his wife and two oldest girls chase him around the garden till he gets hungry and goes into the pen for lunch; for the good farmer keeps no dog. The poor farmer has no pig pen, and when his pigs get out of the yard, he sets his three dogs on them and the dogs bite their ears off and make them bald-headed, and the boys mock them as they go by in the road, and the bears come down out of the woods and eat up those boys, as in old English time.

### "Early to Bed and Early to Rise."

Is the good farmer's motto, and he turns out of his warm couch at five o'clock in the coldest winter morning, and then sits over the stove till daylight, by which time the hired man is up ready to help do the chores. The poor farmer lies in bed till eight o'clock, while his wife gets up and builds the fire and starts the boys off to milk. Look at the difference in their stock. See the noble grace with which the good farmer's horse carries

that excellent man to church where he hitches him in the shed and when that spirited animal hears the soprano sing a solo, he thinks it is an engine whistle and kicks a $200 buggy to pieces, and nearly breaks up the meeting. Now mark the contrast. You will see the poor farmer's horse hitched to a post in front of a saloon, and the wind blows through him till the tears roll down his face and the people going by, pity him. About ten o'clock in the evening he shakes off his bridle and goes home, opens the corn crib door and eats in peace and quiet till mid-night, when the poor farmer comes home and sits up the rest of the night doctoring him for the colic.

**Look at All the Surroundings of the Two Classes.**

Take the wood piles for instance. The good farmer's pile will be straight and square and ten feet high all around. He will send his small boy out after an armful of wood and the pile will tumble over on to him, and they won't find that boy until the next summer. The poor farmer's pile will be scattered around in lots over the front yard and the boys will bring it in and lay it loose around the stove. When he comes home at night he will fall over it in the dark, and make a very big noise and wake up his wife. Just then the clock will strike two and he will have to explain to her how they have been initiating a man into the lodge and she will wonder how the Mason's hall can hold so many as they have been taking in lately, and how her husband can eat so many nasty cloves.

**A Politician, of Course.**

The good farmer takes an interest in politics, he subscribes for the weekly paper, published at his county seat, and finally runs for justice of peace on the temperance ticket and gets two votes.

While all the paper the poor farmer takes is a paper of tobacco and he never gets any office. The good farmer reads and improves his mind, he is posted on all the new theories of government and tries to make his neighbors know all about it. He goes to the Grange and asks leave to read one of Henry George's nine-column articles. While he reads, the women grangers all whisper, and talk so much scandal about their outside neighbors, that war wages from that time forth in that community; while the male members go to sleep with their mouths open and the flies crawl down their throats and tickle them, and make them smile in their sleep. The good farmer thinks he is interesting them and like Tennyson's brook "runs on and on forever."

But the poor farmer, he goes down and plays cards and pool for his amusement and the only mark he makes in this world is a chalk mark, showing that he owes fifty cents to the saloon keeper. The good farmer reads the papers. He consults the monthly reports and the statistics of the agricultural bureau. He finds out that there is to be a war in Europe, and he knows that wheat will be $1.25 a bushel by next spring, so he goes to Chicago and buys 5,000 bushels and puts up $500 as margin and when wheat does go up three cents, he feels mighty good, and figures what he will do with the $2,000 he will make on this deal. And then it slumps and the margin is gone. When they ask him to put up more, he concludes that this wheat speculation is all a gambling business, and he will never have anything more to do with it. The poor farmer takes no paper, and when the Bohemian oat man comes along offering to sell him oats at $10 a bushel and take all he raises at the same price, he buys

ten bushels and gives his note for them. He puts the oats on the barn floor and the hogs get in and rip open the bags, what they do not eat the hens do, and he don't have one of those oats to sow next spring. By and by the man comes along with a hundred dollar note and the poor farmer has to put his farm in his wife's name, and give his brother-in-law a chattel mortgage on his stock to avoid paying it.

### A Seeker for Knowledge.

The good farmer attends the farmer's institute—the Pomona Grange or the annual meeting of the state agricultural society. He goes to that and attends the Governor's receptions and finds him a first rate fellow and will vote for him every time he runs.

He is present at all the meetings of the State Agricultural society and hears such learned farmers as Jack Hinton and Mrs. Dr. Severance and gets his mind *full of ideas* and when he goes home and meets a neighbor he talks tariff to him and talks and talks until all the dogs in town howl before he goes within a half mile of them.

The poor man also has heard of the agricultural society meetings and thinks he will go to them and see if he cannot improve a little. But on his way up town he steps into a saloon to get a glass of beer and becomes interested in a game of pinocle in which he soon takes a hand, and then more beer and then pinocle and then again more beer, until toward night he gets noisy and a man strikes him and a big policeman arrests him and puts him in the cooler over night.

The next morning the judge fines him all the money he has in his pocket, and he makes his way home partly on the freight train and partly on foot, and tells his wife that those agricultural meetings are the best thing he has run on to yet, and what he has learned will be worth more than $300 to him when he comes to put in his crops.

I take one glance at the respective families and then close. Let me compare the children. The good farmer has good children. His boy is neat and well behaved, and is not out in the road "sassing" folks as they go by; no, he is in the house learning the shorter catechism.

When the circus comes round, though he looks anxiously at the bills—he could not be a boy and not do that—yet he recognizes the folly and vanity of such shows, and his parents not approving of them, he stays quietly at home while the procession marches by, content with the promise that if he is a good boy and works well the balance of the season, they will take him in the fall to the cemetery to see his grandfather's grave.

We all know the poor farmer's boy—there is generally six or eight of them. He is always in the middle of the road and *sasses* you as you go by, and you are lucky if he does not heave a rock at you. When the circus comes round he crawls under the side of the tent and comes up under the manager's eye, and the old baboon reaches out and pulls out the most of his hair. But he doesn't cry out or make a noise though he can't wear his hat for nearly two weeks after the show is gone.

The good farmer's daughter is beautiful and accomplished. Her education has been attended to. She can crochet and make tatting. You never see her idle. All the chairs in her father's house are decorated with tidies from her fair hands.

She can make worsted flowers and paint after the manner of the Grecian and the Orientals and knit open work stockings and has a hundred other accomplishments that I do not call to mind. If she does not always get married the only reason is that there is no one in the community good enough for her. If she wished she could have the pick of them —so her mother says.

The poor farmer's daughter has none of these accomplishments. She cannot even draw in rugs. She has to help her mother to make up for the faults of her father. In the summer she does the house work and in winter teaches school. Finally she studies medicine and takes her revenge on mankind by doctoring them.

I have given you now examples of the good and poor farmer. There was once a negro preacher who held faith in these words:

"Brethren," said he, "there are two paths; the broad and the narrow path that leads to destruction; the straight and the crooked path which leads to damnation. Which will you take?"

"In that case," answered one of the congregation, "dis nigger will take to the woods."

As Capt. Cuttle would say, the moral of this story lies in the application of it.

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# SOME HELPS TO HOME MAKING.

By MRS. J. M. SMITH.

### A Good Garden.

Many really good farmers declare that they cannot afford to have strawberries and other small fruits, except as an occasional luxury. Well, if they are to be bought and paid for with the price of oats at 15 or 18 cents per bushel, and other things in proportion, of course he cannot afford it. Yet the very small area of land necessary to produce plenty of small fruits for an average family would not be missed from the amount of grain produced on the farm. He may say he has no time to plant or cultivate it; in fact, I know many farmers who seem to think their time would be as good as wasted in planting and caring for a vegetable garden; while, in fact, a single acre in small fruits and vegetables of desirable varieties, well cared for, will do more to promote the health and comfort of a family, to say nothing of the pleasure to be enjoyed, than any other acre on the farm. Only get the boys and girls interested in the care of a berry patch, and let them have a good supply for one year, and they will not be likely ever to forego the luxury afterwards.

In spite of all the poetry written about the happiness and beauty of life on a farm, the fact still remains that there are plenty of hardships for both farmers and their wives, and there is no danger of there being too much pains taken to bring beauty or pleasure, into or around their homes.

### Earnest Young Men and Women.

The most valuable outcome of profitable and successful farm life is realized in the strong and earnest young men and women there trained up to build

future homes, either on the farm or elsewhere; for not all ought to be expected to remain on the farm.

Our country would soon find itself short of capable men to manage its business affairs, and to fill places of public trust, if all the boys should stay on the farm. Then let farmers make the most of themselves and of their homes, thereby treasuring up for their children pleasant memories to help them when they go forth to try their skill in home building for themselves. Then while you see to it that your homes are well supplied with plenty of small fruits, there is still another side to be looked at.

**Man Cannot Live by Bread Alone.**

We are told in a very old fashioned book, that "man cannot live by bread alone;" and might we not add, neither by fruit and vegetables! There is, in my opinion, no way in which so much pleasure can be provided for a family, for so small an outlay of money, as by having fragrant and beautiful flowers around the home.

What shall we have, then? First on the list I would place roses, the queen of all the flowers. I can never forget the roses that grew around the home of my childhood. We enjoyed them while fresh, and when they began to fade we gathered the leaves and scattered them in our drawers and trunks among the clothing, and enjoyed their perfume until the roses came again. Then the lilacs and peonies, which yielded their beauty year by year, with but very little cost or care, were the delight of our childish hearts.

The perennial phlox in variety are very satisfactory later in the season, and give a long succession of bloom. I speak first of the perennials, because when once established they remain year after year with very little expense. Of course the list may be enlarged indefinitely, as taste and means permit.

But we must have a few of the many beautiful annuals, of which I would put first, pansies, with their infinite variety of colors and markings. I have often heard children compare them to baby faces, and I think the comparison very apt.

**Flower Seed.**

The seeds should be sown very early, in hot-beds if possible, but if there is no hot-bed a cold frame is, I think, much better than a box in the house, as the plants are likely to be stronger and more thrifty. Four pieces of board (which any woman who can use a hammer can nail together at the corners) will answer the purpose. This should be placed over a bed of mellow earth and pressed down at the bottom. If you have any unused windows, they may be placed over the frame, as this will make it possible to plant earlier without danger from frost; but if not, a piece of strong cotton cloth will answer a good purpose. Loops should be securely sewed on to the corners to keep it properly in place, and it will keep off quite a sharp frost. Make the rows from four to six inches apart, in which sow pansies, annual phlox (I prefer the grandiflora varieties), pinks, asters, candytuft, balsams and such other varieties as your taste may dictate. By raising nearly all your plants in this seed bed you can get better plants than planting the seeds where the flowers are to bloom; you will also have many more available plants, as they may be grown quite thickly in the rows, then you will also have the advantage of having but a small space to keep clear of weeds, as we all know that they will grow much

faster than the plants that we are so anxiously looking for.

### Care of Plants.

When the young plants are large enough to be clearly seen, carefully loosen up the earth between the rows, and sprinkle with water when needed. Then when the weather is warm enough for thrifty out-door growth, have the ground where you wish them to bloom carefully prepared, and transplant the young seedlings into permanent beds. If you cannot have a hot-bed, I would not try to grow verbenas plants, as they may be had from any florist for a trifling cost. I have mentioned but a few varieties of annuals, but every one may enlarge the list according to their own taste, or according to the time and labor that they may be willing to give to their care. A few plants well cared for, will afford much more satisfaction than many more if they are neglected. The ten weeks stocks and sweet alyssum, I always plant in a shallow box set up quite off from the ground, as if planted in the seed bed, the small black fleas will eat them up as soon as they come through the ground; while if grown in raised boxes, I never fail to get good, strong plants. All this may seem to be a great deals of pains to take for a few flower plants, but if you really love and care for the flowers, it will be only a pleasant change from your indoor cares. I forgot to put on the list of seeds the sweet peas and mignionette, which combined seem to be the very perfection of sweetness. One friend used to have what she called her glory-bed, which consisted of a good clump of sweet peas, surrounded by a border of mignionette. Then near her kitchen door she had a bed of bright portulaccas where she could see them as she passed out and in. She said their beauty rested her when weary. I do not think our Good Father over all would have sprinkled bright flowers so plentifully everywhere, if He had not intended us to enjoy them.

Then let us each bring all the brightness and beauty possible into our homes; they will help in educating and developing the characters of the children who are sent to us to cheer and brighten our lives. In the short time allowed me I have only been able to offer a few hints and suggestions, if they should prove any help or comfort to some tired or discouraged farmer's wife or daughter, I shall be content.

# THE COMING FARMER.

By HON. J. M. TRUE, Baraboo, Wis.

It is not my intention, or wish even, to picture to you a man of physical, mental and moral perfection as the typical farmer of the future. Neither will I attempt to please you with highly colored sketches of the beauties and joys of farm life, the superlative grandeur of the farmer's vocation, or the mental and moral excellencies supposed to naturally cluster around the tilller of the soil.

That much is truthfully said that reflects credit upon the farm as the place from which strength and purity is drawn to replenish the vitiated currents of business, intellectual and social thought and action, I am pleased to admit.

That the present position of the best class of our American farmers is a desirable one, I gladly claim. They need envy no one. But that the condition of a large part of those living upon our farms is vastly inferior to what it should be, and might be, I am also forced to confess.

To consider briefly some things that keep the average farmer of to-day from being what the more successful coming farmer must be is the object of this paper. There are many farmers before me this evening whose active experience extends backward over a period of forty or fifty years. The wonderful changes that have taken place within that time in connection with agriculture alone are hardly realized by you even, so gradually has the work of progress been accomplished. Where wide stretches of native forest and prairie then met your view, cultivated fields and pleasant homes mark the advance of our American genius and civilization.

### The Log Cabin of the Past.

The rude cabin of the early settler now stands obscurely in the shadow of the modern cottage as a reminder of the days of small beginnings. Commodious barns and stables indicate the channels into which, or through which, thrift and enterprise have led the prosperous possessor. "Old Brindle" has passed away with the primitive quarters erected for her comfort, while in the new stables the better bred and more aristocratic Short-horn, Holstein, Jersey or Guernsey are found. Poor "old Brindle!" what might *you* have accomplished had you been quartered in this model stable, fed a ration of ensilage, clover hay, wheat bran and oil meal, and drank warm water.

Old "Doll" and "Dobbin" plowed the fields, cultivated and gathered the crops, drew the grain many a weary mile to market, and then hitched to the same and only vehicle on Sundays, briskly jogged to the country church. Now the general-purpose horse is unpopular. The muscular Clyde or Percheron furnishes the motive power upon the farm, while the dashing roadster, in a nickle-plated harness, at a three-minute gait, draws the top buggy, in which the farmer's son sits and manipulates the lines. This new horse is not a church-goer. He goes, but not in that direction.

The farm implements of our boyhood, when muscular developments had a practical meaning, have given way to improvements that lightened labor and made it possible for a boy to do the work of ten men.

**Modern Improvements.**

The wives and daughters of to-day know little of the peculiar household cares of their grandmothers. The cooking range, the washing machine and clothes wringers, the sewing and knitting machines, factories for the manufacture of dairy products, illuminating oils, and many other lightners of toil have come to farmers' homes within my recollection.

Our mothers, fifty years ago, contentedly and well performed their household duties, without the advantages of these modern improvements, and knew little of that modern necessary evil—hired girls.

They were mistresses of their homes, and a consciousness of their independence and natural resources contributed largely to that strength of character we so gladly ascribe to them.

The favored children of to-day seem to be born to a degree of intellectual and scientific advancement, that it would have taken ten years of application in the schools, for their grandparents to acquire, while our social and educational advantages as completely overshadow those of the past, as do improvements in any other given direction.

As the modern school building with its appliances and apparatus is superior to the old log school-house, with its rude benches and bare walls; so the methods and breadth of educational thought differ widely from the past.

An early acquaintance with good books, music, proper games and recreations, in our homes are comparatively new, but strong influences in moulding character, and nurturing that most sacred sentiment—a love of home.

We repeat,— the favored farmer's home to-day is one of the pleasantest in the land. Shall this condition become generally applicable to the class?

**Get Out of the Old Ruts.**

We cannot believe that the spirit of progress that has so signally blessed the American people in the past will fail to continue its beneficent work; but to expect that the coming fifty years will be as prolific of invention, scientific achievement, and intellectual advancement as the past fifty has been, requires a remarkable degree of faith in the unseen.

Farmers, as a class, are perhaps the most difficult to lead out of old, long traveled ruts, and into a *trial* even of that which is radically new.

They do not contribute largely to that changeful, restless element, that would keep society in a constant ferment, and render the foundations of government, even, uncertain.

If they are more persistently loyal to political and religious antecedents, than most other classes, they are also slow to recognize those lines of thought and action that lead up to the better methods and conditions in their own particular interests.

These pecularities are largely attributable to the isolated character of their lives, to a failure to mingle in society, to assert their individuality, and to consult with the more successful and intelligent of their own class, about mutual interests.

Their narrow view of life leads them to harbor feelings of distrust and jealousy of those around them, especially the more successful of neighbors engaged in the same occupation as themselves; while better methods, better business habits and better education are regarded as delusions.

**Intelligence and Prosperity.**

If the average farmer of the near future can be brought to the general plane of thrift and intelligence, now oc-

cupied by the best representatives of the calling, this will be one of the great social and political events of the century.

To accomplish this the coming farmer must be intelligent in his work; he must recognize the fact that to be a successful farmer he must be a successful business man. No other occupation calls for closer discernment and intelligent action. The wide-awake farmer is not only a producer, but a manufacturer. He must therefore understand the nature of soils, the value and influence of fertilizers, and the laws that govern plant growth. He must be familiar with the principles of the breeding of farm stock, the general form, characteristics and adaptation of the various breeds of the animals he handles. He must have an intelligent idea of the profits he should derive from the enterprise in which he engages. He must have well defined ideas of the values and effects of feeds, that when combined they may produce required results. He will be a buyer and seller, and as such should cultivate a ready and correct judgment. He should study the markets from a consideration of the question of supply and demand, in order to buy and sell at a profit. Instead of being controlled by circumstances, let him aim to be in position to use them for his advancement. If the successful merchant deserves the title of *business* man, the successful farmer should have equal claim to the distinction. The coming farmer will be an active man in public affairs.

#### More Education.

Educational, social and political reform must receive a strong support from the farmer.

Such reforms are an absolute necessity to the maintenance and advancement of his interests, and only will he prosper as they are fostered.

The common school is coming to be more and more an institution peculiar to our rural districts, and the general tendency of advanced pupils from these, to seek better instruction in our village and city high schools has in itself an element of danger to the common district school.

Let not the intelligence and wealth of the country neglect the educational interests of the masses, because better instruction is available to their favored sons and daughters.

The farm will continue to be the best place in which to rear strong brainy men, and pure noble-minded women, and though these may not remain on the farm, but as in the past go out to give strength and character to business, intellectual and social circles in our crowded cities, in the future those who leave the farm will in no sense be superior to those who remain behind.

#### An Interest in Public Matters.

The farmer in politics! Yes, he has had his special province here. He has been a *voter*. Whenever political defeat overtakes a party at a given election it is charged up to a failure to vote on the part of the farmers.

The coming farmer will vote oftener. He will vote at the caucus, and as a result more farmers will vote at county and district conventions, and for these more farmers will be found deciding upon candidates for higher official positions.

I am finding fault with the present condition of things, only to say that the trouble lies with the farmer himself, in failing to intelligently and actively participate in movements that define lines of action and nominate candidates.

This need not produce class parties or

class legislation, but will lead existing parties to recognize general interests, and the necessity of the support of the well posted independent rural voter.

### More Faith in Self and Business.

The farmer of the future will believe more strongly in himself and his vocation. He will recognize that no social, intellectual or political barriers are raised before him because of his occupation, but that in common with other classes he will pass for what he is worth, but no more.

He will, we trust, develop a stronger attachment to his farm, which will cause it to be handed down from generation to generation in an unbroken line of ancestry. It shall become to him his bank in which he may deposit accumulations of beauty, fertility, and comfort, and from which may be drawn elements of wealth and happiness for years to come.

When in the future our vast country has been developed; when a largely increased and ever increasing population shall demand that our agricultural resources be taxed to their utmost; when thrift and enterprise shall become necessary adjuncts to insure success; no place will be left for the average farmer of today, and he will unconsciously give way to the more successful coming farmer.



# MISCELLANEOUS PAPERS.

## WILD FLOWERS.

BY WERDEN REYNOLDS.

[Read at the Green Bay Institute, March 4-5.]

The Wild Flowers, the Wild Flowers, uncultured and true;
From nature's own garden—of nature's own hue;
No hot-bed distortions, nor monstrous forms —no—
'Tis thus that I love flowers as God makes them grow.

And thus do I love, too, affections of heart,
Up-welling spontaneous, untrammeled by art—
I love them all true, unaffected, sincere,
Like the beautiful Wild Flowers that God gives us here.

Then, gather life's Wild Flowers from young and from old—
Those grown in true hearts—the pearls and the gold—
Bind up a sweet nose-gay to cheer life's lone hours,
Mementos of dear ones in language of flowers.

The Hawthorne of HOPE, the CONSTANT Blue-Bell,
The PURE drooping Lily that blooms in the dell;
White Vi'let and Myrtle, so MODEST and MILD,
And Woodbine FRATERNAL all native and wild.

The Indian Jasmine ATTACHMENT TO YOU,
The Sweetbrier SIMPLICITY, Bittersweet TRUE,
The Orange Flower CHASTE, of so delicate tint,
And emblems of VIRTUE the Snow Ball and Mint.

The humble-born Daisy, to INNOCENCE dear,
The Osier of FRANKNESS, and Fern the SINCERE;
'Tis such flowers—the wild ones—most dearly I prize,
Earth's loveliest symbols of joys in the skies.

Yes, gather them all from the loved of my youth,
The Wild Flowers of sympathy, friendship and truth,
And wreathe their sweet symbols—with Ivy entwine
A garland of fragrance for memory's shrine.

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## "GATHER UP THE FRAGMENTS THAT NOTHING MAY BE LOST."

By DAVID F. SAYRE, Fulton, Wis.

[Read at Janesville Institute, Feb. 27-28.]

**Low Prices.**

On the third day of this present February, three weeks ago, one of my neighbors took six head of cattle to his nearest market and sold them for a fraction less than two cents per pound. Another neighbor sold on the same day and in the same market stall fed heifers, stall fed during the entire winter, at two cents per pound. Oats in the same market are sold at 20 cents and corn at 30 cents. We know that cattle cannot be raised for $2 per hundred, and a fair reckoning will make oats cost, I think, 21 cents, raised on land worth $40 per acre, and at 9 per cent. interest, and

corn under like circumstances will cost 16½ cents.

What are we farmers to do? Will this state of things bring about the happy time when the farmer can lift up his head and feel that he is even with the rest of the world? Many farmers, and I am not sure that we here are not among them, say "appeal to congress or the legislature." But I can see no reason why we farmers should have laws passed favoring us as a class. No class has a right to be favored by legislation, although it is done to our hurt.

### Save the Residues.

What shall be done? Some two years ago, I was sitting in a railroad car by the side of John Gould, that man who came from Ohio to teach our wives how to make butter, that man, who, I think, can show as much good sense in a butter talk as any man whoever came into our state. Well, he and I were talking about the great Standard Oil company, whose iron pipes, conveying the crude petroleum from the oil wells to the city of Cleveland, ran under a part of John Gould's farm. He told me that when the oil first came pouring into Cleveland, it was refined there, and the refuse, a black, filthy liquid, was turned into huge vats in the ground and burned, covering the city with a great, black, impenetrable smoke. All this was lost. After a little it was discovered that this refuse, treated by certain chemical substances, would yield naptha and benzine enough to pay for the whole cost of refining. There was still a residue, a refuse, which went to waste, until some one discovered in it parafine and aniline dyes, and these more than paid for the entire expense of refining.

Is there any way by which we farmers can treat the residues on our farms to bring about a like result? After we shall have cut our hay, or reaped our harvests or gathered our fruits, is there any residue, using which, we can lessen the costs of producing these crops? This question brings me to the point to which I wish to call your attention for a little time—the residues on the farm.

### Nature's Fertilizers.

It is but a little time since we came into Wisconsin, we find these openings, these prairies, these lands, now turned into farms, covered by a carpet of green verdure, not one bare spot in sight grass and flowers, flowers and grass, and so it had been all the ages before. Nature, and when I say nature, I mean the God of nature, nature has been fertilizing these lands for us by the continued yearly growth, and yearly decay of vegetation, the snows of winter, and the verdure of summer, alike protecting and enriching the soil. We came and began our work, turning up the furrows and casting in the wheat. Not one year, not two years, but year in and year out, until we had taken from the soil in a good degree, the elements which made wheat raising profitable, then the soil refused to answer our calls, and we were forced to give up wheat. Isn't that your experience? Is not that the experience of all Rock county? Think for a moment what we had been doing; taking the wheat, the grain, which was perfectly legitimate, what did we do with the straw, the residue, the great bulk of the crop which came off the land?

### Sell the Grain and Burn the Straw.

How many of you pioneers can hold up your heads, and with a good conscience say "we returned it in its best form to the soil from which it came, to help reproduce a new crop." Oh, the

blazing fires of the straw stacks on the prairies of Rock county during the fifties and sixties. I don't want to throw a stone at a neighbor's glass house, but you may fling one at me, and if I wince at the blow, I'll bear it as best I can. One of the many reasons why wheat has fallen from 30 bushels per acre to 10 bushels or nothing, is because of this foolish waste of this residue, the straw.

Within a few weeks I have seen loads of straw going from the farms to a neighboring village for sale. It may have been right under the circumstances, but it was a part of the blood, and next year's crop will suffer from the loss of it. To return to the text, the straw is one of the residues, one of the "fragments, to be gathered up that nothing be lost."

From wheat raising we were driven by our own short sightedness in a good degree, to raising corn, a change for the better for two reasons, first, corn means hogs and cattle, and second, corn means a less severe drain upon the fertility of the soil. But in all these years succeeding wheat raising, what was our corn but a crop of grain, so many bushels of ears to the acre? How many years did it take us to find out that in every crop of corn there were two crops—the crop of ears and the crop of corn stalks. Have we really learned it yet? How many of us really think that the corn fodder is nearly if not quite, as valuable as the crops of ears? The saving of this residue, the working it up for all that it is worth, calls for the earnest attention of every farmer. On a cold morning out of a snow covered stack, to dig out the fodder for the morning's feed, the but of every bundle frozen fast, this is no light task, and if the boy shirks the work, and the cattle low for more, I am scarcely surprised. But even at the best, although the cattle get plenty, they leave the great, thick stalks on the ground uneaten, to be drawn out for manure in the spring, the stalks in whose cells is stored up the sugar which those cattle ought to have.

### Better Methods.

There is a better way. A great many of you have found it, but some have not. A few days since I had occasion to call upon a neighbor, a young farmer, a bright, hard-working man. I found him on his barn floor with his hired man cutting up his corn stalks, handed down to him from his tobacco shed, where they had been housed and cured from the rains and snows of winter. I looked at the stalks, bright, soft, unbleached and greenish, worth at least 33 per cent. more than if he had stacked them out of doors; and then the gain in cutting—well, you must go to Prof. Henry if you would know the full per cent. in gain. I thought, as I looked at him, my dear young farmer, you are learning early in your farm life what we old pioneers learned only by hard rubs; and I thought, too, that that was the best use I had ever seen a tobacco shed put to. I speak of this, not as anything new to you, but something new to him.

This method is a great advance in husbanding this residue, yet, I think, if you will take my experience for so much, that the cheapest, handiest, easiest and altogether the most satisfactory way of caring for corn stalks is by means of the silo. I think, with the corn crib and the silo, we can well nigh gather up the fragments of the corn crops and little be lost. The point I wish to make is, that good farming—successful farming—demands that you save, not the ears only, but the stalks as well, in the brightest, most savory way for the stock which eats them.

In a late popular novel the author severely inveighs against the doctrines of a certain religious denomination, doctrines, which that denomination, in common with others, used to hold fifty years ago. In answer to this one of the critics of the novelist remarks that she has used her powder in "cannonading dead tomb stones." You may think, that in recalling to your minds the wastefulness of farmers in regard to the residues of straw and corn fodder, that I am aiming "at dead tomb stones." But I have noticed in the acres of corn stocks standing uncut in the fields to-day that there is constant evidence that there are plenty of farmers, who need hot shot thrown at them for this very wastefulness.

**The Golden Grain.**

Another question I would like to ask, this corn, this golden grain, which comes to us with, comparatively, so little work, this grain which is so handy on the farm, have we learned how to use it in a way that will bring the best results, in a way that will give the most beef, the most pork? About Christmas day I was called upon to look at some pens of hogs, belonging to a well-to-do farmer, one who earned his money by hard work. There were some twenty-five or thirty hogs in three pens. They were fed by shoveling in to them corn in the ear by the scoopful to be eaten from the pen floor, swimming in filth, quantities of half-eaten corn were lying there utterly unfit for any animal to touch, yet these hogs were fattening for the market. By careful, cleanly feeding that farmer could have made a bushel of corn make him thirteen pounds of pork; thirteen pounds of pork at that time was worth thirty-nine cents (three cents a pound). He would have sold his corn for thirty-nine cents per bushel. One glance at the hogs and pens, would have satisfied you that he did not get more than six pounds for a bushel, eighteen cents for his corn; twenty-one cents residue lost, or at any rate not saved when he ought to have saved it. Just one year ago, Feburary 12, 1889, I weighed eighteen shotes to feed, the average was 174 lbs. During twenty-two days I made them gain one and three-tenths pounds each day. The next twenty-one days they gained one and four-tenths pounds each day. The next six days, I threw off all limits to my feed, I fed them a swill of ground feed, (corn, barley and oats), wet up with boiling water, all they would drink. I fed them the same ground feed, dry, all they would eat, as a relish, I gave them ear corn plentifully, but not so they left any over. All this in a clean house, with warm beds and access to the yard. I wanted and expected to reach two pounds each day. I did reach fourteen pounds for six days, and that, too, notwithstanding the shrinkage of a five and one-half miles haul to market. Each hog made me in gain sixty-one cents in those six days, I sold at $4.35 a hundred. Will you tell me why I did not make the same gain in those days before? Through lack of skill in feeding I lost part of the benefit of that corn crop. You have all of you had a like experience, only all of you have not weighed it in the scales as I did. It is attention to these minor details by which "we gather up the fragments that nothing be lost"

**Skill in Feeding.**

This question of feeding is, I think, the least understood of the many problems of successful farming. There is many a good farmer, I mean raiser of crops, who is a very poor feeder. Many a mother, intelligent in many things, ruins the physical constitution of her

child from unintelligent feeding. The great abundance of our corn crops makes us heedless in answering the question whether we get the best possible result from a given quantity of corn. I once bought some growing shoates at 9 cents per pound, paid $120 for them. Kept them 43 days, including the day I purchased and the day of sale, sold them at 7½ cents. In those 43 days I made them weigh me out $240.50, just double the price I gave for them and 50 cents over. I was so much pleased that I bought some more, heavier, more rangy ones. Kept them six months and over, lost money on them. The same corn kept growing harder during the summer and the teeth kept getting more tender, until they would eat only what would keep them alive. Why didn't I have thought enough, in time, to change their whole corn for ground feed. Ah, how much residue I wasted on these gaunt hogs. But corn in the crib was plenty, if they didn't eat when it was given to them, it was their own fault. When I wanted to turn them into money, they were gaunt still, and I was the loser.

#### Nature Conserves Fertility.

There is another point to which I wish to call your attention. In the beginning of this paper I spoke of our finding these prairies and woodlands covered with a carpet of verdure, grass and herbs and flowers the whole season through. That was Nature's process, never to leave the ground uncovered, never sear or bare. Then we came and broke up the sod, and sowed the wheat. You and I well remember with what delight we watched the crop of growing grain, during those three or four months before we reaped it. After the crop was cut off, during August and September, and October and November what? That bare field lay yellow in the sunshine, drinking in the rains of heaven, and allowing those rains to filter through the ground to the subsoil beneath. Nature had kept on the surface all the time a vast mat of foliage and rootlets, as a sponge, to catch and hold the fertilizing elements of the rains, and to keep them just where the growing crops needed them the most. We changed nature's law one-half of the year. Permit me to use an illustration which I have used many times before. Take a cylinder, hollow 1 foot in diameter and 3 feet long, drive down in the soil of your farm so that the top shall be even with the surface. Lift it now, soil and all and, set it on a table. Take some water surcharged with the richest fertilizing elements of your yards, and pour it into the cylinder. At first you will notice that the water, as it trickles from beneath, will be clear and bright, the fertilizers are left in the soil, and the water runs away clear. But if you continue the pouring in a little while you will see that the water, as it runs away, is just as turbid and yellow as when you poured it in, showing that now the fertilizers are carried down with the water, and lost to the surface where your plants are growing. This, it seems to me, is the process on our farms when they are left uncovered by a growing crop. I don't think I am firing at "dead tomb stones" now. Here are vast stores of fertilizers carried down by rain too deep for the rootlets of our growing plants to get them easily. Can we remedy this? Can we save this residue in part or in whole? In part, without doubt, you do remedy it, when you sow clover and timothy with your grain. That mat of clover, I am well nigh boyish again in my enthusiasm, whenever I see it. But in your corn crop, cannot we imitate nature, by sow-

ing among the corn some grain, like rye, the last time we cultivate the crop, and let it grow during the trying months of fall. By so doing we shall profit by three residues, first, we shall have a growing plant to help keep the enriching elements of the rain near the surface where we need them; second, we shall have a good fall feed for sheep and cattle; third, by plowing under this green mass in the spring we have this easily decomposing crop for a manure. Are not these residues worth saving? Are not these some of the "fragments to be gathered up that nothing be lost?"

To speak of the residues of the farm, in the form of manures, the when and how to care for them, the when and how to apply them to the land, these topics could hardly be discussed in a paper by itself. Your patience would forbid me to enter upon them.

**Success in Butter-Making.**

But one point I want to touch upon before I close. I never approach the domain of a woman except with reverence. But let me tell you of a little scene which occurred some two years since. I came into the house one day and found the queen of the household working butter; don't smile, there is many a queen in Wisconsin who works butter. I looked at her and saw at once that she was tired out. "Oh," she exclaimed, "I had rather do a day's washing than work this hard butter," and then she drew the ladle through the golden butter with all the strength she could get from her elbows. She patted it, she smoothed it, she dug it again with the ladle, then rolled it over and worked it again, and so on for half an hour. I stood and looked at her until she was done. Her face, this face of a queen, was red and heated; her arms fell listless in her lap, her energy gone and her work a burden. I said nothing, but kept up a dreadful thinking all the while. When next churning day came I churned as usual, I had never handled a pound of butter in my life except to eat it, but I had heard John Gould's story of butter-making, and had told it again and again in the household. As I finished, I took off the churn lid, and by that time the queen was by my side. I kindly told her that she had nothing to do with that churn or butter. She remonstrated — some queens, you know, can remonstrate—I was firm; I took John Gould's method, washed the butter in the churn as nicely as a man could, salted it, had a butter pail on hand already soaked and salted, and then I began to take up the butter and pack it into the pail. Then the remonstrances began afresh. "No one will eat that butter, it isn't worked, there may be specks in it, they will throw it away, let me do it"; but the king was firm, the butter was packed into the pail by his own hand, and in a little while it was on its way to Chicago, with a letter telling the whole matter, and ending with, "You can throw it away, or pay me what you see fit."

In a day or two a letter came back saying, "it's such butter as we cannot buy for less than 30 cents; we cannot afford that, but will give you 25 cents if you can supply us." Butter was bringing, say 12 cents in the village. You can surmise that that queen has never worked any butter since, in that old fashioned way.

Moral 1.—The queen has a right, by reason of her queenship, her womanhood, to have the king's shoulders put under the burdens too heavy for her to bear.

Moral 2.—The energies of many a woman have been wasted on work which

she had been taught was necessary, but which was entirely useless. The necessary cares and duties are wearing enough, without adding any unnecessary ones. We owe it to ourselves, to our homes, to skillfully direct the work so as to avoid all undue tension of the nerves, all wasting of the nerve force.

**The Farm Homes Give Industry, Thrift and Character.**

Please let me go into your home, let me see your home life. That boy of yours, strong, manly and stalwart, the world before him. You have used his best physical and mental energies during the season, to make that season a success. He has worked, if not willingly, at least faithfully to the end. You and I have, many a time, looked on and have seen with joy and pride, those youthful muscles and vigorous brains producing with the machinery of today, results which were beyond our reach 25 or 30 years ago. What in your estimation is the end of a farmer's boy's life? To get the greatest amount of work out of him, as you would out of that horse you prize so highly?

**Don't Drudge, Drudge,**

Drudge, all day long in the field, and in the house a listless weariness, which never catches or holds a smile, or gets a glimpse of commendation for the work done? In your house, are breakfast, and dinner, and supper dull, still meals merely to satisfy hunger? Across the table there, has that wearied mother of the household, that daughter, too, as well as the son, had their burdens lightened by any fun, any frolic, any story you could have told? and has any ray of sunshine come to them through you? Oh, how the taxed energies of your household, yes, and your own weariness, too, could be relieved by a smile, a bit of fun, an appreciation of what each one is, by giving in to innocent indulgencies, by cherishing a grateful, thankful, rejoicing heart yourself, and letting the over-flow of that grateful heart surround each one in your home.

**Where Are the Papers and Magazines?**

I don't mean the county paper merely, that is absolutely necessary, but the publications of art and literture. What books are in the library? Books of farming and feeding; all right, don't forget them. But remember that the boy's best book on farming and feeding is out of doors, that he has been reading it for twelve hours a day for 300 days in a year. How would it do to add to the library, for varieties' sake, some books of amusement, of history, travels, some books of biography, some novels, anything good, to draw blood to the brain, while the tired muscle rests. I say light books, too, so long as they are bright and good. Your girl or your boy, after working, say ten hours through the day, is not to be caught and held by a heavy book of sermons or history. If he can be held by singing, let him sing. The old-time singing school did as much good often as an old-time sermon.

The sense of the matter is, the energies of the household, of father, mother, son, daughter, are strengthened, enlivened, made healthy, by driving the farm out of the house while you are within, by winning a smile from the mother, by the radiance of your own face, by dropping a little money into the deft hands of your daughter to beautify your home, by teaching your son that goodness, cheerfulness, intelligence, manliness, independence and hard work will make the home of any farmer in Wisconsin the "palace of a king."

# OUR HIGHWAY LAWS AND COUNTRY HIGHWAYS.

BY D. E. MCGINLEY, Secretary Ozaukee Agricultural Society.

[Read at Cedarburg Institute, March 13-14.]

### The Farmers' Institute.

The farmers' institute is, without doubt, a valuable adjunct to the educational system of our progressive young state, and as a school of the farmer promises to do all that its most enthusiastic supporters expected of it.

It teaches the farmer numerous things that will improve his standing financially, politically and socially; but, thus far it has said too little to him on a question which is of vital importance to every live farmer, and that is: the construction and maintenance of good wagon roads.

The farmer may garner a most bountiful harvest, and yet fail to realize a profit thereon, owing to the fact that the bad condition of the highways prevents him from marketing it to advantage.

In these days of small margins the farmer, in order to make his vocation a lucrative one, must learn to watch the markets closely, and sell the products of his farm when the prices are the best. In order to do this he should have highways that, no matter whether it be March or September, June or December, will always be in good condition for the transportation of heavy loads.

### Good Highways.

"Of all the economic questions affecting the welfare of the farmer and every good citizen; there is none of greater importance than the construction and maintenance of good highways, over which they may pass to and fro in their commercial and social relations with one another."

"The world," we are told, "is maintained by intercourse," and of all inventions, the alphabet and printing press excepted, those inventions which abridge distance have done the most for civilization. Every improvement of the means of locomotion benefits mankind morally and intellectually as well as materially, and not only facilitates the interchange of the various productions of nature and art, but tends to remove natural and provincial antipathies, and to bind together all branches of the great human family.

How often do we hear farmers discussing the financial situation, declaiming loudly against "corners" in the market, denouncing monopolies or demanding reform in every branch of our government, seemingly forgetting that they themselves are a part of this government, that *they* are much to blame for the short-comings of our laws, and that right here at home many of them make bad laws worse by shirking their duty in regard to them. Where is the intelligent, thinking farmer who has given the subject the proper thought, can deny the fact that the highways of Wisconsin are in a deplorable conditions, and that there is great need of reform in the manner of collecting and expending our highway taxes?

We are told that our highway laws are patterned after those in vogue in the feudal days, when, as one of their various duties, the tenants were obliged to build and repair the highways. Wherever it originated, our present manner (it is unworthy of the name *system*) of constructing and maintaining highways is common to a large majority of the states of our Union, and is a disgrace to our thrifty nation and the intelligence of the nineteenth century.

Some of the European countries, France, England and Scotland among

the number, are now blessed with fine highways of which they are justly proud; but history tells us England was cursed with roads, the counterparts of which are so common in the United States to-day. It tells us that it was about the year 1760, that the people of England began the agitation which eventually forced her to repeal her defective highway laws, and to enact the system which to-day is her pride. At that time England's highway laws were similar to those now in force in the country districts of Wisconsin. The peasantry were required to give six days' gratuitous labor on the highways each year, and if that was not sufficient a cash assessment was levied to hire labor.

Their roads became so bad that the markets were actually inaccessible during certain months of the year; and at times the fruits of the earth rotted in one place, while at another but a few miles away, the supply fell far short of the demand, transportation was so difficult.

To remedy those evils, new laws were passed, but each law affected only particular parishes, and between 1760 and 1773 no less than 452 highway laws were enacted without making a material change. Finally a general law was enacted providing for a uniform system of collecting all taxes in money, and for constructing and repairing the highway throughout the kingdom, and from that time the highways of England steadily improved, until to-day a person can ride from one end to the other of that country, over a uniform system of scientifically built Macadaman Telford roads.

#### Our System, A Farce.

Is not the fact very discreditable to our inventive and enterprising Yankee Nation, that it is to-day wrestling with the inefficient highway laws that were discarded by England over a hundred years ago? Should not Brother Jonathan cease boasting of his greatness until he can have highways as good, at least, as his neighbors across the water? Over one hundred and fourteen years ago he rebelled against England's unjust laws, and yet when he came to set up a government of his own, he adopted some of her worst statues, among them the highway laws by which he is still oppressed.

Here in Wisconsin we have the county and town method of road control, the laying out, opening and repairing of highways and bridges being in the hands of the county and town boards of supervisors. The town board divides the town into what is called "road districts." In each road district is an overseer of highways, who has charge of the roads and bridges in his district, and whom the law intended should be under the control of the town board, and should be held responsible for the condition of the roads under his care; but in most towns the last two provisions are practically null and void, owing to the fact that the town board does not require the overseer to qualify as such officer.

The overseer is chosen by the electors of his district. If a vacancy occurs in the office the town board fills it by appointment, and in ninety-nine cases out of every hundred, the overseer lacks the technical skill and special knowledge of road-building that such an officer should possess.

At the annual town meeting the rate of the highway tax to be "worked out" during the ensuing year is fixed by the voters present, and many a voter makes it his special business to be "present," in

order to work and vote for low taxes, be the consequences what they may. The voter from the clay district wants a four-mill or five-mill tax to put the roads in a possible condition, but his neighbor from the sandy district, which has plenty of gravel handy, says that the roads in his part of the town are "good enough," and that he thinks that a one-mill tax would be sufficient. Sometimes a division of the house is needed to decide the question, but generally it is decided by acclamation, when the low-tax men are sure to shout long and lustily, while a feeble response comes from their opponents, and dozens of voters stand around in disinterested attitudes, never opening their mouths, and a low rate is fixed.

The law says that two-thirds of this tax shall be expended before the first day of July. During the last days of May and the first part of June, the overseer, having received the "warrant" from the town board, calls out the men, boys and teams of his district, and for a few days does his best to make the roads worse if anything than they had previously been. Thus, after we have wallowed through the mud all spring, and just when the roads are getting dry and passable, they are attacked by unskilled crews under incompetent bosses, and are plowed and dug up and filled with loose earth and stones, while drainage is generally neglected or ignored.

### The Macadam Road.

As Macadam says: "The whole science of road-making consists in furnishing a solid, dry path on the natural soil, and then keeping it dry by a waterproof covering of stone which should form a hardened, smooth surface fort ransportation;" but our overseers usually manage to build road-beds which will soak in and retain about all the water that falls on or near them. The first heavy rain that comes turns those "improvements" into guagmires, and in the latter part of June the farmer who is obliged to use the highways can be seen picking his way slowly along, while the wheels of his conveyance go down, down through the "improvements" until they reach soil that has not been disturbed by the "road-makers."

July's hot sun drys the artificial quagmires, and soon deep ruts and high hubs or hummocks are formed, over which it is dangerous to ride in a light vehicle, and exceedingly trying in any kind of a conveyance.

A railroad company has men constantly on its tracks, keeping them in thorough repair, but the wagon road has no one to care for it,—no mud-hole is drained, no rut is filled, no hummock is leveled, and when another June comes around the road is generally in a wretched condition.

### Who is to Blame?

Nothing daunted the overseer again orders out his crew, and hauling gravel, which costs fifty cents to a dollar a load by the time it reaches the spot, dumps it into the mud-holes and ruts, and thus levels up between the hummocks, still neglecting to properly grade or drain. As a consequence new ruts and hubs soon appear; and thus the waste of labor and money continues year after year with little or no improvement.

Nor is the overseer entirely to blame for this squandering of the public funds. The law allows each man $1.50 for each day's work of eight hours; fifty cents a day for each wagon or plow, one dollar a day for each yoke of oxen, and $1.50 a day for each span of horses he may furnish, agreeable to the requirements of the overseer. Thus a man with a

span of horses and wagon can earn $3.50 for each eight hours' work on the highways, when $2.25 or $2.50 is the current wages, laboring ten, twelve and fourteen hours a day at any other work.

One would naturally suppose that such liberal wages would induce the tax payer to do his best to honestly earn them, but it is an undeniable and shameful fact that the cases are numerous where the tax-payer endeavors to do as little as possible during the time he is required to spend at road work, and thus cheats himself and the public in general. He is sure not to arrive on the ground until his more honest neighbor has worked a quarter or half an hour. Then he will have long stories to tell and must always cease work while he tells them. Again, he has his pipe to fill, an undertaking that usually takes up a good deal of his time, and he finds numerous other excuses for shirking his duty. Every little while he will stop, look up at the sun and wonder what time it can be, and is often heard assuring his neighbor that they have already worked over time. If he is ordered to bring a team, with wagon and "dump boards," with which to haul gravel, he sure to have low "side-boards" and no "end-boards," sure to avoid using a shovel to assist in filling his loads, and equally sure to avoid moving his team out of a slow walk during the whole eight hours.

### Nor are the Taxes

Thus "worked" the only ones that we have to pay for the maintenance of poor highways. Special taxes are levied, payable in cash, and are expended on highways and bridges as the town board directs. While preparing this paper, I examined the highway records of a certain town in this state. It is a town which is not noted for good roads; but has the name of being a town whose public affairs are managed in a very economical manner. It was organized in 1848, in six miles square, its surface is principally high and rolling, and it has an abundance of gravel which is purchased on very reasonable terms. I found that during the last six years that town had expended $17,700 on its highways, or an average of $2,950 annually. Of that sum over $600 was annually collected and expended in cash, $185 a year being paid for plank and spike for small culverts, two-thirds of which were unnecessary. If this town, which can boast of its economy, squanders so many hundreds of dollars yearly, how many thousands must be wasted by an extravagant town in a like period?

If that town has collected $17,700 wholly in cash, and had expended it in a systematic manner under competent commissioners, it could have constructed at least eighteen miles of well drained, well graded gravel road, or, better still, twelve miles of macadamized road, besides keeping its other highways, in a passable condition.

### One Hundred Years Behind the Times.

After a century of failure, is it not about time to try a change? That is what the intelligent men of this country are now asking; and the question of adopting a better highway system is being agitated all over the Union. New York, Pennsylvaina, Massachusetts, Ohio, Maryland, and Missouri have each made changes in their highway laws during the last year or two; but "that the reform may be thorough and permanent there must be harmony in legislation and unity in aim and purpose,"—a good, uniform system must be adopted throughout the Union.

Before railroads became so numerous some of the states built what were

known as "state roads." These roads were paid for out of the state funds, and ran from one great market centre to another, back and forth across the state, forming a network of highways that were far superior to the other roads, and that were powerful factors in the development of the resources of the commonwealth?

**The Times Require Better System**

It has been suggested that that system should, in a measure, be revived. That all highway taxes should be collected in money. That the state should build and maintain the main roads—at least one or two in each county; the work to be done under the direction of a competent civil engineer, who should be a state officer and should have control of all state highways and bridges. Each town should have a commisioner or superintendent of highways, specially fitted for the office, who should have the supervision and control of all highway work ordered by the town board.

All bridges costing $1,000 or more should be built by the state. Often we find a town through which one or two large streams wind in such a manner as to necessitate the erection of a number of large and expensive bridges. Such bridges are of great benefit to the public in general, and it is unwise and unjust to tax one town the whole cost of their construction and maintenance.

It has been truthfully said that "he who seeks to change a long and established custom, is likely to be the most unpopular of men," for a time at least. He will be disliked by the timid and lazy, who fear the dangers and troubles of a change; he will be fought by those who are satisfied with the old though evil way, and he will receive little support from men who are conscious of the existing evils, because the remedies that he recommends will not act as a charm and instantly remove the ills. "Habit often becomes a second nature, and it is only by the positive pressure of evil that we are driven to reform."

But, farmers of Wisconsin, it is to your interest to work for this reform. Don't say: "Let us wait to see what other states will do." The Badger state seldom, if ever, waits for others to lead. She endeavors to obey the command expressed in her motto; and if you will enter this struggle with a determination to win for the right, our state will, in this, as in other great undertakings, move steadily and gradually forward.

## HOW CAN OUR NOXIOUS WEED LAW BE MADE MOST EFFICIENT IN ITS PROTECTION OF OUR FARMS?

BY DR. R. J. WILCOX.

[Read at River Falls Institute, December 2-3.]

**Canada Thistles.**

The Canada thistle is a weed which seems to have demanded legislative enactment to protect the farmers of the states from its inroads for nearly one hundred years. In the meantime, while state after state has adopted laws for its suppression, year after year it has moved steadily, silently, and resistlessly forward, in its western march.

More than twenty-seven years ago our state enacted a law to suppress it. This law, amended from time to time, with its stringent provisions, stands today as a bulwark to protect our farmers from its occupation of our soil. Coming stealthily, none can tell when nor how, it finds a lodgment in our richest soil, and unthought of and unseen, it secures a foot-

hold on the farm, and is seldom revealed till it appears, not as a single plant, but as an armed host, and he is above the average farmer in wisdom, who, considering the best mode of attack, is able to subdue and exterminate it, and avoid multiplying the pest with plow, cultivator and harrow.

That this most noxious of weeds is with us to stay, is no longer a question. In the counties of Pierce and St. Croix it has established its foothold on more than one hundred farms, which we can locate, and from these points, as centers of dissemination, it will in a very few years find a home throughout the length and breadth of this great valley.

When we listen to the experience of some of our Irish friends who tell us that oftentimes in Ireland before they could harvest their grain they were obliged to go with thick protection for their hands and expend from twenty to thirty days' labor in pulling up and carrying off the thistles from one acre of grain, one may perhaps catch a glimpse of the cost of our crops in a time coming, too soon, unless unremitting vigilance and ceaseless effort by the co-operation of all our farmers enable us to stamp out and subdue this foe where it is.

When we increase the labor and expense of producing our crops without a corresponding increase in the amount and value of the crop, we depreciate the value of our farms.

In some portions of our state farms are found which have already depreciated from thirty to fifty per cent. in ther cash value, because of Canada thistles.

The farms of Pierce and St. Croix counties represent an invested capital of more than six millions of dollars. Permit these farms to become infested with these thistles and how soon will they depreciate in value five, ten, or even twenty per cent. Ten per cent. means a loss of six hundred thousand dollars, the result of slackness and indifference, becaue this pest has not yet come to your farm, that you know of.

### A Good Law.

We have an excellent law, but it needs wise judgment on the part of the commissioner — vigilance, unflinching perseverance and thorough co-operation among our farmers to make it efficient. Many obstacles stand in the-way of its enforcement. In the first place, there is a too general ignorance of its importance and of its requirements. We doubt, if a majority of the towns listen to its perusal at the annual town meeting, as the law directs, or if they hear it, consider it of so much *personal* interest that it need be enforced.

### A Live, Practical Weed Commissioner.

Again, the chairman who appoints the commissioner, is not always wise in his choice. Its duties are often delegated to the overseers of highways—a plan tried for many years under our former statutes and found inefficient in its results.

Again, the weed commissioner often thinks his whole duty done when he serves the notices required, and the ignorance or indifference of the farmers of his town, never suggests any liability of a fine on him for neglect of duty—though some of the noxious weeds are over-running every farm subject to his inspection.

Again, it is often difficult to learn where the noxious weeds are located, except as their presence is disclosed by their abundance—and then the task of destroying or removing, seems too formidable for any immediate accomplishment.

Again, it sometimes happens that the officers of one town are vigilant in their

compliance with the law, while a neighboring town neglects its duties in this respect. It then becomes the duty of each and every farmer to whom this knowledge may come, to follow up this neglect, even if the fine is necessary. The law is ample in its provisions and its enforcement should be a matter of interest with all.

Again, a mistaken economy often causes the chairman to restrict the watchfulness and care of the commissioner so that he fails to accomplish and finish the work committed to his hands. This becomes especially apparent sometimes in the case of lands owned by non-residents. The law requires the occupant to prevent the noxious weeds from seeding. In the practical working of the law the tenant is sustained in claiming he occupies only the land he tills. The fence corners, the roadsides, the waste places, where many of the noxious weeds find a safe retreat, are not in his occupancy, and therefore if attended to at all, must be under the supervision of the commissioner.

In one town we can name, three patches of Canada thistles for the past three years have grown, bloomed, and sown their seeds unmolested. Again, the freedom of action of the commissioner is restricted by the very general impression prevalent, that the time to reach these weeds most effectually, is when the seeds are nearest being fully ripened. Consequently, many deem the commissioner intruding, trespassing on personal rights, over officious, if he, seeing the ripening crop, insists on their destruction before they are ripe.

Again, the farmer crowded with his work in haying, sends the boys to destroy the thistles. They report having done so. He rests easily, but inspection shows the work imperfectly done, in boy-fashion, cutting the stalks so far above the ground that many branches with their crop of blooms and seeds are unharmed, an occurrence happening in several instances under our own observation the past summer among some of the best—certainly among some of our largest farmers.

But leaving these minor points which are easily remedied by the farmers when they understand the situation, let us consider the best way to exterminate the various weeds named in the law. This has been discussed by Prof. Goff, in *Bulletin* No. 20 of the State Experiment Station, and to which we shall recur very freely in these remarks.

### Noxious Weeds.

The burdock (Lappa officinalis), is a biennial plant, that is, it reaches maturity at the end of two years from the seed and dies. If the stalks are cut when in full bloom below the crown it will give no further trouble.

The cockle bur, clot bur (Xanthium Strumarium) is rapidly gaining a general foothold in this vicinity. It is an annual and if faithfully followed with cultivation is easily kept in subjection. But while it seems at home in almost any soil, it is especially luxuriant on our dry runs, and is evidently spreading, by the water conveying and planting the seeds along their borders from which it invades the farms.

Sour dock, yellow dock and curled dock (Rumex crispus) is spreading very fast in this section. It is a deep rooting perennial plant, and if pulled and thrown on the surface will perish, but will retain for a long time vitality enough to grow, if it becomes covered with a little earth. It is very abundant in many portions of our country and threatens much permanent annoyance.

The ox-eye daisy, white daisy or white weed (Chrysanthemum Leucanthemum) is reported from four towns in Pierce and two towns in St. Croix counties. Summer fallowing or devoting it to a hoed crop is the plan recommended by Prof. Goff.

The snap dragon, also called by some toad flax, butter and eggs, (Linaria vulgaris) is one of our very noxious weeds when once it obtains possession of the soil. It monopolizes the ground, is very aggressive, and is difficult to exterminate. Prof. Goff recommends summer fallowing as the only effectual treatment. It has a footing in several towns about us and is proving more than a match for a single season's summer fallow. Perhaps repeated plowing while summer fallowing would subdue it.

The sow thistle (Souchus arvensis) is a perennial plant nearly or quite as difficult to destroy when established in our soil as the Canada thistle. It is reported in several towns near us and resists all ordinary means of treatment. A friend who has been contending with it for several years, thus speaks of his experience with it. He says: I have tried to subdue the sow thistle by thorough cultivation with corn, this will keep them from seeding if *thoroughly* cultivated, but the root stocks are loosened and scattered and the following year the weeds are more numerous than before.

The same is true of summer plowing, as far as my experience goes. I have tried it to some extent, but with little success. I have tried pulling them, but this only puts them back a little more than cutting, as the fine roots break off in the ground and send up new stems. Seeding to grass and pasturing will check their growth and prevent spreading and in parts where the stock travel back and forth a great deal will kill them, but this treatment will not exterminate them, for in land I have had in pasture eight years, and seen no thistle for five years, when plowed, I find roots of the thistle in some places, and these will send up stems and blossoms as soon as the land is cultivated. A heavy growth of clover seems to smother them out the best of anything I have tried, but it is hard to get a good catch of clover on land badly infested with these weeds. I have sown clover with oats on one piece of ground two years in succession and failed to get a catch of clover, this year I sowed the land to buckwheat, plowed that in when in bloom and then fall sowed rye. I thought that plowing the land in June and then immediately sowing the buckwheat which is a rapid and rank grower would be better than summer fallowing, then plowing under this crop I thought would smother the thistle roots to a considerable extent and the rye sown this fall would get a start a head of any thistle that might be left, and so keep them down, this is not yet proven, however. I have killed some small patches by covering with half rotten straw to a depth of sixten or eighteen inches.

### Canada Thistle.

The Canada thistle remains for our consideration, and an examination of the experiments cited by Prof. Goff may aid us in solving the difficulties which surround the question of exterminating the weed. Some of our friends tell us that they have no fear of Canada thistles. They have had large experience with them and can kill them every time—in the meanwhile we can point to numerous patches established from five to fifteen years, treated with watchful care every year to some of the means which are so sure to exterminate, and

every year has seen the patch spreading till the single plant of ten years ago now occupies a quarter to one-half acre, and of all the patches not one in fifty has yet been exterminated. Why this discrepancy in statement and fact? The experiments in New York, of Ambrose Stevens in 1841 to 1845, referred to by Prof. Goff, explain this: Three soils were tried: 1st, a strong clay loam intermixed with slate. The thistles here were killed by plowing nine inches deep in April and repeating till September in a very dry season. They did not survive the third plowing.

The second soil was shallow upper soil, vegetable mould, alluvial deposit and clay resting on hard pan. Three tests were made on this soil—fire heating the ground to hard pan, fire and salt, a plat soaked to the hard pan three times with strong brine. All these tests were completely successful—the thistles were destroyed in each case.

The third soil was a rich alluvial bottom; the roots penetrated three feet deep. Here plowing deeply six times from April to August only made the thistles more vigorous than before. This plat the next year was planted to corn May 2d, and plowed and hoed in June, July August, and hoed in September, but in October the thistles were more vigorous than ever. Salt and fire were equally ineffectual on this soil. Red top grass sward was tried, and wherever the grass became established it choked out the thistles. Timothy and clover on bottom lands failed. The last named soil in many respects would fairly represent the average soil of this portion of the St. Croix valley where we find the thistles. His conclusions are worthy of our careful study. Whatever will effectually exclude the plant from light and air will destroy it.

Wherever the soil is of a depth permitting the root to be reached and effected in its whole extent by the plow, hoe, fire or salt, the thistle may be destroyed by these means.

In all bottom grounds where the roots descend deep and the soil permits access of air, neither the plow, hoe, fire nor salt will destroy the thistle — here the grasses will be found the best destroyers. Whatever limits the *thorough* application of the means of destruction will proportionately diminish success. Hence, in many locations it will be found difficult ever to eradicate them, the plow will not reach the roots, and the roots will not grow thick enough to smother them. Sheep, salt and the scythe will have to follow them with ever watchful vigilance. One of our friends in an adjoining town says he has destroyed them on his farm after two or three years of faithful labor by destroying, every ten days or two weeks during the growing season, every shoot or leaf which appeared above ground.

Col. Dill, of Prescott, tells me he has made a very thorough test of kerosene the past summer, but without success.

Prof. Goff truly says that the past sixty years have added remarkably little to our knowledge as to the best means of extirpating this plant.

Such being the nature of it, already established in one hundred and forty farms in Pierce and St. Croix counties of which we know, and with twelve towns in the two counties not heard from, but with a reasonable presumption they are more or less infected, is it not time that the farmers of this valley should be awake to the coming of this pest, and very much in earnest in destroying it where established?

The question at once recurs, how far will the faithful enforcement of this law

be sustained by the farmers. No commissioner can carry out the requirements of the law against the opposition and example of a very few of the leading farmers of his town. Very quickly would he find his footsteps watched and he be told he was partial, afraid to disturb the well-to-do farmer and quick to molest the poor, over-worked man of less pretensions. There should be an honest pride among all our farmers to so enforce the law for themselves, avoiding all occasion for the commissioner to visit their premises on account of any of the weeds named in this law. Many think the law well enough when applied to thistles, but of little benefit when applied to the other weeds it includes. Can the commissioner do his duty and discriminate between the weeds mentioned when he sees them permitted to grow unmolested. These are some of the questions for you to consider and aid the honest efforts of a faithful officer instead of opposing or treating with indifference his endeavors. Intelligence and experience will teach us how to meet the requirements of this law in the best way and in the meantime patience and earnest co-operation will make the law of value to all without disturbance to any.

## CLOVER.

By C. H. EVERETT, Beloit, Wis.

### Clover is King.

Of all plants raised on the farm the clovers are the most valuable. Clover is the only crop we can raise that will yield a direct profit, and at the same time enrich the land; it furnishes at one and the same time, the best hay crop, and the best manure crop.

But some farmers seem to think if they seed a piece of land in clover and let it lay for four or five years that land is enriched for all time, that is wrong, and shows a lack of knowledge as to the intelligent use of the plant. Clover should never be left down longer than the second year.

### Sow With all Small Grain.

My method is to sow clover with all small grain, and when the crops are taken off at harvest time the whole farm with the exception of corn land, is green with clover, it protects the land from the burning sun, and later on makes good fall feed. One should keep up a rotation, sow every spring and plow up a portion every fall.

I always sow in spring just ahead of roller, I never sow more than six quarts, and have had a splendid stand from three.

Land plaster used in connection with clover can not be too highly recommended. We are told by learned men on this subject, that all vegetable matter while decaying generates ammonia, which becomes vaporized at 80 degrees, and consequently lost to the soil, but by the decrease of the temperature of the atmosphere, the ammonia is condensed with moisture brought down by dews and rain, the plaster being mixed with the surface of the land acts to hold and incorporate it with the soil, whereby it becomes fixed as plant food.

### Increases Fertility.

I had a piece of land a number of years ago that had become so depleated it did not pay for cultivation, I sowed it to rye, and the next spring in March I seeded to clover on a light snow at the rate of six quarts per acre. When that rye came off that yielded, by the way, ten bushels per acre, I found a nice growth of clover, by not pasturing it in the fall, the following spring it was all

alive. The first of May I sowed 100 pounds of land plaster to the acre, by the 15th of June I had a heavy growth for that soil. I commenced cutting on that date, cut it all down and let it lie; in a few days the second crop made its appearance, came right up through and grew very rapidly, when ready to cut for seed I used the old-fashioned reaper leaving it in windrows. I obtained from that ten-acre piece thirty bushels of clean seed that sold for five dollars a bushel. I then took the plow with sod jointer attached, and turned it over, plowing under the first cutting, the next year that land produced seventy bushels of shelled corn to the acre. Now how do we acount for the increased productiveness of that field in two years. I reason it out in this way. The long clover roots reach down into the soil absorbing fertilizing influences that are beyond the reach of ordinary vegetation, bringing them to the surface, and as I said before the ammonia brought down by moisture is caught and retained by the plaster the whole when plowed under is secured for the soil and held as food for the succeeding crops, and by plowing under as I did, the first growth of partially rotted clover, it had a tendency to loosen the soil and make it more porous. But were I to redeem an impoverished soil again, I would cut the first crop for hay, then sow plaster again and turn under second crop when in blossom. Clover, when properly cured, makes the finest kind of hay for all kinds of stock.

**Curing Clover—Hay Caps.**

We all know that to obtain the best possible results, clover should be cured in the cock, but to do this successfully the first requisite is the hay cap, for the average farmer with 10 to 15 or 20 acres of clover, five or six hundred will be sufficient, they cost $5 per hundred and are nothing more than good cotton cloth tear them off one yard square and hem the rough edge, tie a stout cord to each corner, fasten the cord to a smooth stick ten inches long, these are used to fasten them down, such caps, if taken care of will last many years, and they are almost water-proof when drawn tight, and will pay for themselves in one year in quality of hay. As soon as clover begins to look red all over the field, it is time to commence cutting. Many farmers make the mistake of waiting until the heads begin to turn brown, and before they are through cutting is very ripe, every change after the blossom is full is to mature seed, and the stalk is constantly changing to a woody, hard substance that is indigestible and worthless.

The mower should be started in the morning as soon as the dew is off, but never before, cut what you think will make 150 cocks, see that none is left in bunches at corners or other places, it should all have the sun for 3 or 4 hours, if the weather is favorable; by one o'clock or a little later it is ready to rake and cock up, it should not be put in great, large piles, but as the hay is green, it can be put into nice piles of medium size, the caps should be put on, and pinned down by sticking the wooden pin well into the hay. The next day repeat the operation, and so on until the end of the fifth day when you have got 600 or more caps covering as many piles of hay; on the morning of the sixth day, if the weather is fair, the first 150 caps should be taken off and the hay opened, by nine o'clock or when you have finished cutting for the day, it is ready to go in and the caps may be used again, so after the first five days you can cut and draw every day until done, your hay will not get wet nor will it all

dry up in the sun, but it will come out of the mow in March bright and green, and every head and leaf is saved. Hay put up in this way stops drying up and sweats in the cock, and will not heat in the mow.

By the best possible results obtained by all other methods, one-third, and many times one-half, of the feeding value is lost, and it is poor economy in my judgment to raise 20 acres of clover to get the feeding value of 15, besides the handling, carting, storing, etc., of the five acres, only to cart it back on to the land in shape of poor manure. Ten acres of clover hay, cured as every farmer can and ought to cure it, is worth more than twenty acres of the coarse, woody, nuwholesome stuff we find everywhere in abundance. Cut what you can handle and make first-class hay of, and plow under the rest. Invest a few dollars in hay caps and be convinced.

## AN INTRODUCTION TO THE BEE AT HOME.

BY REV. JAMES BAIN, OXFORD, WIS.

[Read at Westfield Institute, January 23-24.]

Permit me to open before you an average swarm of bees for a five minutes inspection, that we who prize the product may become better acquainted with the producers or manufacturers, which may be turned greatly to our advantage.

I see even now alarm clouding many brows while you look suspiciously around to see a *real* hive brought forth with vivid recollections of some past experiences in which you and the hive suddenly parted company exchanging a long to be remembered smart for a sting.

Our hive will be but pictured to the understanding, an introduction by letter to the honey bee, associated with the history of man through all the ages of the past, giving to Israel's promised country the descriptive title of

**"A Land Flowing With Milk and Honey."**

Bee-keeping has become an important national industry, there being 300,000 bee-keepers in the United States, with an estimated annual production of 50,000 tons of honey. Our own county is not behind its neighboring counties in utilizing this very important channel of pleasure and profit which adds much to our national wealth.

The habits of the bee have been carefully studied by learned and scientific men in ancient as well as modern times, developing the fact that in all the annals of natural history nothing is found more interesting and wonderful than the internal affairs of a bee hive. An average colony contains 30,000 inhabitants, composed of a queen or mother bee, several hundred drones or males, and workers of undeveloped gender, the mass of the colony, the government of which is not monarchical, as many suppose, but purely democratic, which fact should produce political affinity. The queen, the only perfect female, seems to have allotted to her as sole duty the depositing of eggs in brood cells, prepared by the workers. From 100 to nearly, if not quite, 2,000 are deposited daily, according to the season and weather. She can be readily distinguished from them by her size which is much larger. She certainly is the center of attraction among her people, who bestow upon her the great attractions and affections.

She possesses a sting but never uses it excepting in combat with a rival queen. Never goes abroad after her bridal tour excepting with a colony swarming, and retains her vigor about three years.

Drones, gentlemen of leisure, differ much from the queen in appearance, are less active, have no sting, no probosis for gathering honey, no basket for pollen, no socks for the secretion of wax which the workers have. In the latter part of summer they are usually looked upon as unnecessary and burdensome members of society and are put to death.

### The Workers.

Workers are the sole laborers, bringing into the hive four substances out of which is produced all things necessary for the construction of the hive, raising the young, etc. 1st. Honey nectar of flowers extracted by a kind of probosis, stored in honey sacks and carried to hive. This honey has to be prepared by mixing with it formic acid secreted in the bees' jaws and mixed with honey by vigorous stirring. 2nd. Pollen dust is used to feed young bees and cap over their cells as it is porous and very much cheaper. 3d. Propolis or bee glue obtained from the willow, poplar and other trees used to cement cracks and crevices and as stays to strengthen cells. 4th. Water to give drink to their babes and mix with their food. Wax or bee tallow is not gathered like the other material, but secreted under little scales underneath the abdomen. When wax-making, they eat honey and hang together in clusters while the operation proceeds, causing their owners often to judge them wrongfully, thinking them idle, The queen begins to lay as soon as pollen can be secured from blossoms, which is mixed with honey and water partly digested by the bee and laid in the cells with the eggs to feed the larva as soon as hatched. In about 3 days the larva hatch a tiny worm without legs. They are fed until about 9 or 10 days when they nearly fill the cell refuse to eat and are sealed over.

Around themselves they spin a silken sock changed from larva into a perfect bee coming forth in about 20 days from hatching, and 4 days later go forth as master workmen wearing out their lives during busy season in about six weeks.

Queen cells can readily be distinguished from other cells, much resembling an acorn cup and are placed in the comb vertical instead of horizontal in outer edge of comb.

Young queen bees are fed with royal food and come to perfection a few days sooner than the others. With this brief insight into the hive among its busy inmates another five minutes would give an outline of their culture drawn from my own personal observation and experience.

### A Blessing to All.

That every farmer and fruit grower is benefited by a few bees in the neighborhood is now a well established fact. They perform an important service by fertilizing the blossoms of fruit-bearing trees and seed-bearing plants, mixing the pollen with the stigma of the flowers when in search of honey.

Therefore, although the manipulations of the apiary differ materially from the farmer and horticulturist each so contributes to the welfare of the other that harmony and good will can but exist. Let no one entertain the belief that any one can be a successful bee-keeper or that they can be kept profitably in all localities. A natural inclination or aptness for the business which can and must be developed by personal application as thorough and persevering as that required in any of the great branches of industry is necessary, and yet although but few have the faculties,

time, means to become thorough apiarians there are few who may not aspire to ordinary proficiency which shall yield them a generous remuneration for labor expended. Especially would I recommend apiculture to adults of either sex in search of health who would find light out-door employment with genial mental exercise better than a medical course of treatment, with profits instead of doctor bills as their share of the enterprise. Many farmers, too, whose ambition survive their ability to do general field labor or oversight, might lengthen out their days profitably with a few bees. All necessary information can be secured by reading A B C of Bee Culture, by A. I. Root, Medina, O., together with some standard bee journal, such as *Gleanings in Bee Culture*, by the above named author, and the *American Bee Journal*, published by Thos. G. Newman & Son, Chicago, Ill, who also issues the Honey Almanac which reveals the fact that in the culinary art honey can be used instead of sugar in almost every kind of cooking, is pleasant to the palate and healthful to the stomach. An excellent article on the hygienic advantage of honey over all other sweets has been given to the public by Dr. J. W. Vance, of Madison, while from Mr. Tefft, good authority, we quote: "It is a true brain and nerve food. It gives refreshment and nutriment to mental and physical energies, new life to the weak and debiltated, relieves nervousness, improves the appetite, tones the systém," etc.

Apiarians have their favorite breed the same as other stockmen, so that with beginners either the Italian, Cyprian, Syrian, Holy-Land or the brown German bee will sufficiently answer. Last season from 30 colonies of the German, or common black bee, I received about 2,000 lbs of salable section honey besides more than doubling the colony, yet I think the Italian is the general favorite. Bees do not work for nothing and board themselves, so pasture is necessary, consisting in this county of basswood or linden and buckwheat. Two of which must be in sufficient abundance within three miles to meet their demands. The old box hive must be laid aside with the sickle and hand loom as curiosities of antiquity and some approved moveable frame hive with supers and sections used. My experience with the Simplicity Langstroth and Wisconsin is that either is desirable, although I rather prefer the Wisconsin. Super honey in one pound sections are better in the ordinary apiary extracting, many yield greater returns but require far more time and skill with a less general market. Wintering in a dry cellar with a uniform temperature of 45° is my choice. Take them out when willow and soft maple are in blossom.

Put on supers as soon as clover blossoms appear. Feed weak colonies with honey or syrup made of coffee "C" sugar. Take honey to market crated in good shape so that the maker's name is a guarantee that all is as represented and all will realize the fact that we, too, live in a "land flowing with milk and honey."

## HOME EDUCATION.

By ALICE BALL LOOMIS.

[Read at the Lone Rock Institute January 2-3.]

'Tis education forms the common mind.
Just as the twig is bent the trees inclined.
—POPE.

**The Common People.**

Common minds like common people are the rule upon this earth of ours. Abraham Lincoln once said that he thought "the Lord must have specially

loved the common people, for he made so many of them." Now, because he has made so many of them, it stands *us* in hand—"we common people with common minds"—to see that we make the most of our opportunities of securing the best education or the proper development of all the faculties of the mind. Our schools and colleges are doing a great work, but their efforts must be premised and supplemented by the education of the home to obtain the best results. Education begins with consciousness. From this time on, the formation of mind and consequently character are greatly the result of invironment. Rarely do we see a beautiful characrer rise lily-like from the mud and slime of social mire—rather are they the fruit of careful tending and pruning. The education which marks a character for integrity must be received under the parental roof. And no act, however small, but contributes its share to the making or marring of it.

The little toddler just becoming initiated in the mysteries of falling and catching itself, accomplishing the first, but failing in the second act, is perfectly capable of understanding that it was not the "naughty floor" that was to blame for the bump received. But how many mothers in giving their sympathy to the little one, blame the "naughty floor," and strike it for "hurting baby," thus giviug the first lesson in untruthfulness and teaching the child to shirk the responsibility of its own acts. Sympathy should always be given, it is one of the divine attributes of humanity, but never at the expense of absolute truthfulness.

#### All Eyes and Ears.

Figuratively speaking, a child is all eyes and ears, and the impressionable mind retains all of their communications. How necessary then that each childish inquiry should be truthfully answered, and that each act it witnesses should bear the stamp of genuine integrity. For the seed of dishonesty once sown, the *extent* of its fruition can not be computed. A carelessness in business relations, a neglect of the smaller affairs of life to the indiscriminating might convey an impression of dishonesty, and as discrimination is largely a matter of cultivation, we cannot expect children to possess it in any great degree. Therefore, even a seeming carelessness should be avoided and each adjustment of affairs however small, should be made with such nice precision of justice as to leave no room for misconstruction. When we have given integrity for the basic principle of a character, we have a sure foundation, and whatever the superstructure may be it cannot fail to possess moral beauty.

The law of self-preservation which nature has planted so strongly in all organisms reaches its highest development in man in what we denominate the business faculty. And it is the province of parents to see that its principles are properly regarded—teaching by precept and example.

#### Industry and Economy.

The proper sphere of the business faculty is not of dominion. This is the abnormal development and therefore should be restrained—for the man whose intellect, love for his family and mankind are swallowed up in business, is indeed a pitiable object. For him the sun never shines nor the flowers bloom, he views nature only with an eye to what she can produce for him—he is dead in all that makes life worth the living. But, that care for *future* which provides for the physical and intellectual com-

forts, which is marked by industry and economy is the proper function of the business faculty.

In the household of the farmer especially the practice of these virtues is a necessity. The profits of the farm are not large and if obligations are met promptly as demanded by good business method and strict integrity as well, there is very little room for what in common parlance is called "style"—unless we close the avenues of culture to meet the demand, and to do this is to condemn our better selves to inanition and thus deprive us of the purest enjoyment of which human beings are capable. For the pleasures of the senses and the gratification of pride are not to be compared to the pure delight of intellectual and spiritual activity.

Habits of industry and economy are the prime factors in a business training with a skillful care and the higher faculties be not stunted or lost in *their* activity. In the process of education it is well to bear in mind that the *abnormal* development of our faculty means a corresponding latency of others.

The home culture of the intellect is too often neglected by the farmer. The long days of manual labor stupify the mind and deaden all desires but those that are distinctly physical. But with the coming of winter the stress slackens and a disposition for amusement appears.

The love of play is one of the properties of animal life and we do not look for the exemption of the human animal. But we do look for something more.

There exists a widely prevalent disease which could be properly named Intellectual Laziness. It is in a great *measure*, no doubt, the natural sequence of the too great physical activity which the law of self-preservation under our defective social system entails. But it is our duty to make the most of our opportunities and to make our opportunities, when within the bounds of possibility.

Amusements should be directed into intellectual channels when time is a consideration.

### Culture and Information.

The daily conversations of the family may consist in the discussion of intellectual topics—history—its connection with the affairs of to-day. The schemes of government for the betterment of mankind. Biography, the debt of gratitude we owe to great characters who have made our existence in our present state possible, their emulation in all that our *added* advantages render consistent. Philosophy, its relation to our lives and literature with its pen pictures of beauty and love. Its dark characters that have failed to shadow forth the divinity that dwells within them, and met the reward that is meted to such and others who have lived the higher ideal life placing self a willing sacrifice upon the altar of truth—all of these things as annexes to the well selected and regular evening readings are fruitful topics of conversation.

### Know Thyself.

There is growth and development in their assimilation, not only intellectual, but moral and spirtual as well. "With wider view come loftier goal." It has been said that "books are the grindstone upon which we sharpen our intellectual weapons," and it would not have been far out of the way to have added *moral* weapons. We do not expect a nice ethical perception in the African savage, but fill him with the contents of good pure books and we have a Fred Douglas. A miraculous metamorphosis!

No, simply an illustration of the potency of environment. Nature furnishes us no miracles, all is the result of "law and beauteous order."

"Yet I doubt not through the ages one increasing purpose runs,
And the thoughts of men are widened with the process of the suns."

It is man's high prerogative endowed with reason and volition by an infinite wisdom, to co-operate with that law. To develop his own mentality and to aid others to the extent of his ability is a duty that the quickened conscience can not fail to recognize, for the hoarding of a truth, whether through fear of ostracism or till such time as it shall become valuable among men is a crime against the universal law of evolution, the *intelligent* co-operation with which is the ultimate destiny of man.

### Love of Country.

The subject of patriotism is at present occupying the thoughts of some of our people to a considerable extent. Perhaps the dearth of it in public places has aroused the people to the necessity of its cultivation. As a result of this awakening we have the nation's flag in our school room as a means of its inculcation. Patriotism is one of the higher virtues, but its roots lie deeper than mere respect for a symbol. Patriotism means love of country; it means a love so deep and broad that the nation's highest good is a chief consideration; it means a broadening of the family circle until it extends to the country's farthermost limits.

Patriotism never can be construed to mean respect for a symbol which is a shield for injustice. There was a time when our flag protected chattel slavery. Then its flaunting folds were synonymous of injustice and outrage to those pure souled patriots, the early abolitionists; but when the flag symbolizes justice and equality, homage is spontaneous and does not require cultivation. We can not be too careful that homage to the nation's flag and *patriotism* be not confounded. It is the privilege of the units upon which this government rests to say what the flag shall symbolize—whether it shall be partisanship or the dictates of a *pure* patriotism.

### Aim at a High Ideal.

The home is the nursery of high ideals, great ends cannot be attained without them. A thing must first live in thought before it can be shaped forth to the world. The steamboat first existed an ideal in the mind of Robert Fulton before it sailed up the Hudson.

The ideal citizen has an abiding sense of his responsibility. He realizes that it is his business to know for himself, and to rely on his own judgment, for it is impossible to tell how far self-interest may influence the judgment of others. Goethe said: "Think for yourselves, even though you may think wrong."

The ideal citizen judges measures and men at the bar of conscience, and he does not give conscience a vacation when he goes to the polls in the exercise of the chief duty of citizenship. The ideal statesman is one who is capable of anticipating the needs of the governed, who is above a bribe in any form, who *realizes* that the true function of government is the protection of citizens in the exercise of their natural rights, and that to do more breeds injustice. He realizes that governments derive their just powers from the consent of the governed, and that the "governed" are not all the male sex.

The ideal being of whatever calling is one who adds to professional excellence

the exemplification of the golden rule in his intercourse with his fellows.

My chapter on the lessons of the home would not be complete if I omitted politeness. Some one is responsible for this comparison: "Politeness is like an air cushion; there may be nothing in it, but it eases the jolts of the world wonderfully." And I would have every one a Chesterfield, with the genuine kindly feeling which is the prompter of true politeness. Even the empty forms are active agents in harmonizing the little discords which are liable to occur in the home circle, and are therefore worthy of cultivation; for the discords once harmonized, the farms will not long remain empty. It might be charged that I have omitted the main feature of the home education should I fail to speak of religion. But integrity of character and the strict observation of moral precepts are the foundation principles of religion. That higher development in which the soul takes cognizance of its relation to the infinite and co-operates with it is an attainment which is the natural sequence of the self-abnegation which a higher sense of duty entails. The subtilities of theology should have no place in the education of a child. Give him a strong character and a matured reason and he will try all things and prove all things and come out the stronger for the conflict.

**Have a Teachable Spirit.**

People of advanced and middle age are too apt to think it too late in life for them to do anything in the educational line and leave the younger members of the family to work out their own salvation.

Home education should be co-operative, each member contributing his share. Such old sons as "you can't teach an old dog new tricks," should in white house parlance, be consigned to "inocuous desuetude." These oft-quoted lines of Longfellow seem to fit nicely right here:

> It is too late! Ah, nothing is too late
> Till the tired heart shall cease to palpitate.
> Cato learned Greek at eighty. Sophocles
> Wrote his grand Oedipus, and Simonides
> Bore off the prize of verse from his compeers,
> When each had numbered more than four score years.
> And Theophrastus at four score and ten
> Had but begun his Characters of Men
> Chaucer at Woodstock with the nightengales
> At sixty wrote the Canterbury Tales.
> Goethe at Weemer, toiling to the last
> Completed Faust when eighty years were past.
> These are indeed exceptions; but they show
> How far the gulf-stream of our youth may flow
> Into the active regions of our lives
> Where little else than life itself survives.
>
> For age is opportunity no less
> Than growth itself, though in another dress,
> And as the evening twilight fades away,
> The sky is filled with stars invisible by day.

## TOBACCO CULTURE.

By LEVI KITTILSON.

[Read at Stoughton Institute, January 2-3.]

This is a subject that is out of the general line of discussion at the Farmers' Institutes of the state, but to hold an institute here at Stoughton without this branch of farming on the program, to ignore a branch of farming that is so general in this vicinity, was undoubtedly considered unwise by the authorities. Although the use of tobacco is considered by all decent people as a vile and nasty habit, and justly so, nevertheless we farmers of this part of the state are perfectly willing to furnish all such foolish people with the weed, provided, however, as long as there is a profitable

demand for the product, but of course at the same time pitying the young dude struggling to form the habit, as well as the older slaves to the use of the weed. I doubt if the southeast part of Dane county today would have shown the well cultivated farms, the fine buildings and the general prosperity of the farming community of this section, if the growing of this *vile stuff* had never been engaged in, but in its place had spent their energies entirely to the progenerating of the Jersey cow.

#### Sowing the Seed.

I have been successful in getting a good stand of plants by sprouting the seed in sawdust, and sowing it when well sprouted on newly fitted seed beds, tramping it down thoroughly with the feet. And for covering the seed beds, I have never known anything better than this so-called "tobacco cloth," sold by agents through this section. It is very thin and seems to be a sufficient covering to hold the moisture, and at the same time thin enough to get the full benefit of the sunlight, and will keep the plants a-growing right along. Last spring I used this kind of covering side by side with common sheeting, on plant beds that were sown at the same time, and in all respects exactly similar. A marked difference could be noticed from the start. Those under the "tobacco cloth" came up sooner, grew larger leaf and healthier looking plants from the start and were ready for transplanting fully ten days ahead of those grown under sheeting.

This cloth is sold through agents, and costs retail from 2½ to 3 cents per yard, and there is undoubtedly a large profit even at these figures, because the agents can be seen traveling through the tobacco growing sections in as fine "turnouts" as any of the farm implements agents use. However, it pays the grower to use it, as it enables the grower to get earlier plants, and earlier plants means earlier tobacco, and early tobacco is usually the best in this locality.

#### Preparing the Ground.

My tobacco field is on the edge of a prairie, consequently my experience will not hold good on clay or a hard soil, but on mellow land. My experience teaches me, that on such soil as I have, that to plow in the fall is only beneficial so far as plowing under second growth. Where there is not sufficient second growth to warrant it, I do not plow the land in the fall, but prefer plowing twice in the spring. The first plowing is usually done between seeding time and corn planting, plowing quite shallow, and afterwards planking it down smooth. Then I apply all the manure I can get, which is the only rule necessary in applying manure to a tobacco field. The second plowing is done just before the transplanting season commences, and we then plow as well as we know how. The more dragging, pulverizing and smoothing the better, as it is labor well spent because it saves labor in the cultivation of the crop, besides being in better condition for the transplanting by holding moisture longer. I have noticed fields side by side, where transplanting could be done all day after a shower in the field that was twice plowed in the spring and thoroughly fitted, while in the other field with the same amount of rain, but the ground was thoroughly fitted, the ground would be too dry in an hour or two for transplanting. Therefore, if this was the only consideration and benefit to be derived from thorough plowing and fitting the ground, it would more than pay for the extra labor.

### Transplanting.

In the last year or two machines for transplanting have come into quite general use. As to their merits over and above the old fashion of back bending, I am not prepared to say, as I have had only one season's experience with a machine, and the crop also being destroyed by hail. However, I am going to use a machine for setting my tobacco this next year, and am of the opinion also that the last acre has been set on my farm by hand. My main reason for this belief is, to set more plants to the acre. I believe the great fault with us here in not getting as fine a quality of tobacco as the climate and soil will allow, lies in our tendencies to plant too many acres and the plants too far apart. If we would plant only six or seven acres where we now plant ten acres we could by making the soil rich and strong, plant just as many plants on 6 or 7 acres as is usually set on 10 acres, and get a much better quality of tobacco, and as many pounds, too, as are usually raised on ten acres. I saw a crop the other day of the Spanish variety which yielded 2,000 pounds to the acre. It was set 18 inches in the row and the rows a trifle less than three feet apart. The usual yield of Spanish tobacco is about 1,000 pounds to the acre, and the average yields for the state seldom go as high as 1,000 pounds per acre, thus showing that close planting does not diminish the weight of each individual tobacco plant, but that it weighs as much when closely set as when set far apart, besides being usually a finer quality.

### Topping.

When to top, and whether to top low or high, is a question that growers differ in greatly. I believe that the tendencies of the majority of those that believe in low topping even top too high, and also let the plant develop too much before topping. We are liable to be penny-wise and pound foolish in this matter of topping. We may go into the field with the resolution to top low. We take hold of a plant below a large leaf, we look at it, hesitate, and finally say to ourselves "this will cure out," and the result is that the large leaves seen on the ground with the top when you first commenced to top, will gradually grow less in size and fewer leaves with the top broken off. In topping low the leaves spread more and makes leafier goods, and undoubtedly gives as good a yield per acre, if not better than when topped high, and the top leaf will be as good as the rest of the plant.

### When to Harvest.

Any experienced tobacco grower can tell a green tobacco field from one that it about ripe; but when it is ripe enough is when we differ, and no wonder, because we know by sad experience that in some years our tobacco would cure out badly, being full of white veins, fat stems, green leaves, black leaves, etc., almost regardless of the time it had been allowed to ripen in after topping. It is usually conceded that the late tobacco will contain the most fat stems, but this year is an exception; the earliest harvested tobacco has more fat stems than the late tobacco. What is the cause? Can you tell? I certainly will not attempt to account for it. We have our theories as to the causes of these unaccountable freaks of nature, but experience tells us that our theories can not always be relied on. We all know that to enable tobacco to ripen it must be growing. In dry, cold and chilly weather, when the tobacco does not grow, it will ripen less in twenty days after topping than it will in ten days with warm showers and a hot sun.

Therefore, we cannot be guided by the number of days since topping, but by the actual condition of the crop, as to when it is ready for harvesting.

For inexperienced persons as good a rule as can be laid down for them to follow is to harvest when good-sized suckers appear the entire length of the plant. Another reason for the slow ripening of the crop is in allowing the suckers to grow until the time of harvesting. Tobacco can be suckered as much as five or six days before harvesting, if well and thoroughly done, and it will not be necessary to go over it again before cutting and harvesting. By keeping the suckers removed it hastens the ripening and thus enables the grower to harvest sooner and get his crops out of the danger of hail, wind and frost, which are elements that may change the question of profit or loss in a day or less. A grower feels comparatively safe when the crop is harvested, but before it is harvested and safely housed he does not know whether he will have a crop or not. Tobacco should not be allowed to wilt too much on the field before piling, because when wilted too much the leaves adhere to stalks and is more liable to defects in curing than when wilted only sufficient for handling without breaking. The practice of leaving cut tobacco out over night is also a bad practice, as you run the chance of having a shower come up during the night to spatter mud on it, besides a heavy dew is sufficient to make dirt adhere to the leaves lying on the ground.

The distance between the laths in the shed is a matter that no rule can be given for. There are so many conditions to consider, such as the location of the shed, whether it has a damp bottom or a dry one, whether your shed is surrounded by trees or is exposed to the wind from all directions, etc., and also what you *think* the curing weather is going to be. The kind of weather in the fall is the main factor, but the grower does not know what kind of weather he is going to have before it is too late to remedy his error in hanging his tobacco. I have a damp bottomed shed, and hang the laths usually from seven to eight inches apart, I have in some seasons had shed-burn at this distance apart, while these last two seasons it would have been better for the curing if the crop to have hung the laths only half that distance apart on account of the extremely dry weather. Thus we see that to procure a fine crop of tabacco, requires experience and thorough work, good judgment, and a considerable portion of good luck. Nevertheless an observant and thorough farmer—will succeed a part of the time, but a shiftless grower—hardly ever.

### Stripping.

It is my opinion that tobacco should not be taken down before the weather has been cold enough to freeze the stalks, because it evens up the colors in the leaf, when next time the tobacco comes in cure. A tobacco stalk is green until it freezes and therefore does not help to color the leaf, but after a hard frost it becomes brown in color and when tobacco is in cure its juices run partially into the leaf and gives the color, but this is only my opinion with many other growers, while there are scores of others that practice and advise taking down and stripping as early as possible, so that this question is one of many that the "doctors disagree on."

### Assorting.

Very many growers get an erroneous idea how tobacco is assorted in the ware-

house by the dealers. A grower happening into an assorting room where a poor crop is being handled by a packer will wonder at the carelessness shown in the *assorting*, and will go home with the conviction that the much talked of warehouse sorting is a humbug, and when a dealer afterwards should happen to say to such a grower that his tobacco is good but poorly assorted the grower will naturally think such talk is all nonsense because he has seen the warehouse men do it worse still! The fact in the matter is, that a dealer when handling a poor crop *does not assort it all.* He merely sets his men to evening up as to length, called "sizing", and ties it into "hands" and pack it and send it to Europe for the foreigner to smoke, whose sense of smell is not so delicate as the inhabitants of this country have. A crop of tobacco that contains enough wrappers or even binders to warrant spending time and labor on, you will find the packer assorting with care every time. And on this point is where the grower frequently makes a great blunder by not spending necessary time and labor on a good crop, or sells it in the "bundle" for a song, or on the other hand spends a great deal of time and labor on an inferior crop, and likely as not asks fifteen cents a pound for it because some neighbors has received such a price. We should study the requirements of the trade as it develops from year to year and spend our time and labor judiciously and also be able to tell what quality of goods we are handling.

**Packing.**

If there is one thing more than another that spoils the looks of tobacco and hurts its selling value it is careless and poor packing. Tobacco should always be laid away straight and closely together at every stage of its handling, as well in the "bundle" before assorting as afterwards, besides tobacco once thrown carelessly together with the leaves sprawling in every direction, the tips of the leaves curled, etc., it is almost impossible to get it back again into good shape. And such tobacco is frequently sold for a cent or two a pound less simply for the reason of its defective packing.

## CORN CULTURE.

By O. S. Sisson, West Salem, La Crosse county, Wis.

The culture and production of corn may properly be divided into "three" classes as follows:

1st. The soil and preparing it.
2nd. Seed and planting.
3rd. Cultivating and tillage.

**Preparation of Soil.**

In presenting to you the subject of soil and preparing it, we must say that in our observation as a farmer for the past 23 years, we find that there is too much "hap-hazard" and wrong ideas maintained; that corn planted on any kind of ground, with all of the different kinds of soil that Wisconsin has, can be made successful and profitable to the producer.

Observation has led us to believe, that many fields are annually planted when the fertility is poor; also on side hills that will wash away when the frequent rains come, or on low, wet ground which cannot be cultivated, and put in proper condition for planting, at a date to fully mature in the fall before the frost comes, and lessens the crop from one-third to one-half.

As has been proviously mentioned all kinds of locations and ground are not suitable for corn.

But we would dispel the "delusion" that corn is not only "King," but one of the best paying crops for the farmer, and can be enormously produced on most any kind of soil, where the *fertility* is properly preserved; and this can easily be maintained by the free use of "clover," and an annual ration of crops. Should the fertility of the soil, through excessive crops or other causes, be exhausted, sow to grain and seed down to clover, with not less than six quarts per acre of clover seed. The following fall and winter take the litter from the horse stables, and cow stables, and haul directly to the fields and spread, as fast as a load accumulates. And continue in so doing until the fields are too soft in the spring to go on to them, as they should not be trampled upon while the frost is going out, and not until they become quite firm and solid. If sufficient time has not been secured to complete dressing of the field, it can be continued (ordinarily) until about the 10th of May, when it should be thoroughly dragged with a smoothing harrow, then it will not impede the cutting of the grass.

If the soil has a mixture of sand and clay, great results will be received by sowing from 50 to 75 pounds of plaster per acre, by which the clover will receive immediate benefit, which will also help in restoring the fertility.

Make a specialty of cleaning up all of the old straw stack bottoms and yards where horses and hogs and cattle have been kept, and finish dressing the field after haying.

No fears need be entertained by spreading of the coarsest straw or manure, as the clover will soon grow up through, when it will readily rot, and furnish food to make strong and vigorous roots to the plant. And at your plowing which may be done in September or October, at a depth of five inches, you will not find the soil in a doughy and heavy condition; but in light and good order, which will pulverize up freely and finely, and should be leveled with a harrow before the ground freezes up in the fall, which will greatly facilitate the time in the spring, as well as improve the condition of the soil.

In preparing the ground in the spring for planting, it should be commenced as soon as dry enough, or at an ample date to secure early planting.

Not waiting as old "fogy" notions would have it; for the sweet tones of the "Lark" and "Whippoorwill," but commence at once. The surface of the ground to the depth of two inches should be thoroughly pulverized and made fine with farm implements. We use the Gorham seeder and slanting tooth drag, and go over the ground twice with the seeder, and twice with the drag before marking, which is sufficient not only in properly fitting the ground. But in eradicating all early weeds that have a tendency to start.

This system of restoring "fertility" to worn out land is just as applicable when the field is used for pasture, and can be followed with corn with equal results.

Under the head of class second seed and planting, comes a very important part of the success of the crop.

### Seed.

The seed should be selected from the loads at husking time when the "best," "choicest" and *purest* ears can be sorted out, and a place secured where the heat of a stove will dry them out sufficient to shell in about four weeks, and before it will *sour* or *mold* on the *cob*, thereby injuring the germ or sprout, which seriously retards the growth. In regard to the variety we would say: If

corn is your principal object and you wish to secure large yields, a staple variety of the "yellow" dent is highly recommended.

### Planting.

Circumstances and conditions of the ground sometimes make it preferable to plant in hills three feet eight inches apart, which is usually better adapted in working the cultivator. If planted in this manner an average of three and a half stalks to the hill is sufficient.

As the seasons are not alike, we are somewhat governed by the time and indications of the weather "prospective" to the time of planting. We have planted as early as the 27th of April and as late as the 12th of May, and in each case had good corn. Though as a rule we consider late planting more risky, as three frosts in the spring are preferable to one in the fall, before the maturing of the corn.

The best results are usually obtained by not planting over an inch in depth, also before the ground becomes too dry. Many fields are made a failure by late planting followed by a few weeks of dry weather, in which there is not enough moisture to swell the kernel and start a growth.

The utmost care should be used in regulating the *planter*, and watch the depositing of the kernels as to the required number.

We will give you one incident where a farmer got behind with his planting, and in a desperate hurry repaired to the field with helpers, when the click of the planters could be heard, showing a lively pace throughout the whole day in order that the field might be finished.

Meanwhile the required amount of seed had been taken to the field and placed in care of a six-year-old son to watch while they were making their rounds, as there was no time to fix *pens* and *fences* and "pigs" were free commoners.

The weather being favorable it needed only a few days before the corn began to come up. But, to the astonishment of the farmer, a majority of the hills were limited to "*ones*" and "*twos*."

He remarked, in the presence of his youthful son, that the seed which he got from his good neighbor must be poor, as the planters worked good two or three years ago, and a second tour was made to the field for examination.

The father yielded the point when the son showed him his hills he had planted in his arrangement of the fox and geese ground; and he only put in *two* quarts in each hill.

### Cultivating and Tillage.

"Cultivating and tillage" is the last but not *least* consideration in which the farmer leaves his crop in condition for nature's "development."

And by so doing he will be in readiness when the weather is favorable and the ground not too wet; and give the field one or two good harrowings before it gets up, which should be followed by weekly cultivating until the "tassils" are quite conspicuous.

Corn should be cultivated at least six times, we frequently run through ours the seventh. Cultiuating after tassiling out is beneficial if the ground is not stirred to deep to injure the roots.

Please remember when corn is three to four feet high the roots are about of equal length and form almost a solid mat from two to eight inches under ground across the rows.

With ordinary seasons and previous good management, not much hoeing need be done. There should be a few days of spare time between haying and

harvesting, when a person can go over about five acres a day with a hoe, and cut down all weeds that have been left and are likely to go to seed, which, if left, not only help to use up the "fertility" neccessary for the crop in its advanced stage, but are serious "eyesores."

No doubt many of you who are present at this meeting today, were observant of the fact that, owing to the repeated frosts of last spring, some were in a state of "disparagement" and openly avowed any possibilities of the maturing of a crop, and many fields were thus neglected. While those of you, who did not propose to be thwarted, and let the weeds predominate, and took the time and eradicated them were bountifully rewarded.

"Narrow, indeed, must be the scope of one's business, wherein arises no time for the "destruction" of "weeds." "Retribution surely overtakes wron g-doers."

### A Low Average.

Before closing this subject we wish to inquire how many there are here, who wish to be classed under the "head" of "*average Wisconsin farmers?*" Who, according to the secretary of agriculture says, only produce 26½ bushels of corn to the acre. Let us see where the profits come in. It costs six dollars per acre to raise corn. Add to this four dollars more for rent of land—which equals ten dollars, "actual cost." Now, 26½ bushels (the average for Wisconsin farmers) at 30 cents per bushel, would bring $7.95, which shows a loss of $2.05 per acre.

Now, this estimate shows on the face of it, there is something wrong, and such yields can not be tolerated with any degree of success. Each and every farmer should try and lay a foundation for better yields, which only can be done with renewed fertility and proper cultivation.

In this system as given you, we have been able to produce at one time, 82½ bushels of shelled corn per acre, from a field of 10½ acres. The yield was ascertained as follows. Each load was counted and set down as fast as husked. Three average loads were weighed:

First load weighed 25 bushels and 30 pounds.

Second load weighed 26 bushels and 15 pounds.

Third load weighed 25 bushels and 40 pounds.

But they were called an average of 25 bushels to the load. The number of acres was ascertained by counting the rows each way, which would make it aproximately correct. Last year we made an other estimate from a field containing 13 acres. A double box found to be 10 feet long and 26 inches deep would hold 45 baskets. The total number of loads was 52. Measurement of ground by rows, this yield was found to be 180 baskets per acre.

These figures may seem rather astounding to some, but this may be somewhat lessened, when we stop and consider that there are 3,240 hills on an acre when planted 3 feet 8 inches apart. If they produce 4 ears to the hill, and each ear weighs one-half pound, you will have 92½ bushels per acre of shelled corn, or if you can grow three ears to the hill, with an average of one pound to the ear, you can produce the "enormous" amount of 276 bushels of ears per acre, which equals 138 bushels of shelled corn.

But, says one, can ears of this size be produced? To this we would say "yes." The fall of 1888 and the fall of 1889, we had ears on exhibition at the *Journal* office in West Salem, that averaged over

a pound and a quarter, which was witnessed by many people.

Thanking you for your kind attention, I leave the subject for your consideration.

## DAIRY EXPERIENCE.

By Dr. C. V. Porter.

[Read at the Viroqua Institute, Jan. 14-15.]

In the winter of 1888-9 I commenced using Short's test in a dairy of twenty-eight cows. I did not purchase a complete apparatus. I sent to Greiner, 63 Maiden Lane, N. Y., for a dozen bottles graduated on the neck, and for a ten and twenty cubic centometer pipette, the smaller for measuring acids, the larger for milk. The chemicals I had prepared by our city druggist. The alkaline solution is now made of one pound Babbits' Potash to two quarts soft water. The acetic acid used should be the U. S. P. acid, sp. gr. 1,047. The tin man make me a water bath (an eight quart pail with copper bottom), for a rack for the long style of bottles I took a tin maple syrup drum and made a dozen holes in it for bottles and holes in bottom and sides to admit water. Thus for less than eight dollars I had a twelve bottle test apparatus with chemicals for two or three dozen tests. The cook stove took the place of a lamp.

Fourteen of the twenty-eight animals tested were half-blood Jersey heifers 19 to 28 months old. This accounts partly for an average yield of only 155 pounds.

The following table gives *approximate* amount of butter made by each cow, together with number of pounds over or under estimated cost of keep, and estimated profit or loss given by each cow for the year ending September 15, 1889. This statement is predicated on butter product alone, not reckoning growth of heifers, calves, skim milk or fertilizers into the account:

*Average Cost Yearly Keep of Cow Estimated at $25.00. Butter for Test Year Netted About 19 cents per Pound; Hence it Took 133 Pounds of Butter to Support an Average Cow.*

| | Profit or Loss. |
|---|---|
| No. 1 made 321 lbs. buttter, or 188 lbs. over cost of keep | $35 72 |
| No. 2 made 183 lbs. butter, or 50 lbs. over cost of keep | 9 35 |
| No. 3 made 271 lbs. butter, or 138 lbs. over cost of keep | 26 22 |
| No. 4 made 174 lbs. butter, or 41 lbs. over cost of keep | 7 79 |
| No. 5 made 217 lbs. butter, or 84 lbs. over cost of keep | 15 96 |
| No. 6 made 117 lbs. butter, or 16 lbs. less than cost of keep | 3 00 |
| No. 7 made 143 lbs. butter, or 10 lbs. over cost of keep | 1 90 |
| No. 8 made 135 lbs. butter, or 2 lbs. over cost of keep | 38 |
| No. 9 made 143 lbs. butter, or 10 lbs. over cost of keep | 1 90 |
| No. 10 made 196 lbs. butter, or 63 lbs. over cost of keep | 11 97 |
| No. 11 made 127 lbs. butter, or 6 lbs. under cost of keep | 1 14 |
| No. 12 made 152 lbs. butter, or 19 lbs. over cost of keep | 3 61 |
| No. 13 made 149 lbs. butter, or 16 lbs. over cost of keep | 3 04 |
| No. 14 made 183 lbs. butter, or 50 lbs. over cost of keep | 9 50 |
| No. 15 made 186 lbs. butter, or 53 lbs. over cost of keep | 10 07 |
| No. 16 made 81 lbs. butter, or 52 lbs. under cost of keep | 9 88 |
| No. 17 made 169 lbs. butter, or 36 lbs. over cost of keep | 6 27 |
| No. 18 made 185 lbs. butter, or 52 lbs. over cost of keep | 9 88 |
| No. 19 made 185 lbs. butter, or 52 lbs. over cost of keep | 9 88 |
| No. 20 made 20 lbs. butter, or 113 lbs. under cost of keep | 21 27 |
| No. 21 made 128 lbs. butter, or 5 lbs. under cost of keep | 95 |

| | |
|---|---|
| No. 22 made 258 lbs. butter, or 125 lbs. over cost of keep | $23 75 |
| No. 23 made 114 lbs. butter, or 19 lbs. under cost of keep | 3 61 |
| No. 24 made 90 lbs. butter, or 43 lbs. under cost of keep | 8 17 |
| No. 25 made 179 lbs. of butter, or 46 lbs over cost of keep | 8 74 |
| No. 26 made 65 lbs. butter, or 68 lbs. under cost of keep | 12 92 |
| No. 27 made 113 lbs. butter, or 20 lbs. under cost of keep | 3 80 |
| No 28 made 67 lbs. butter, or 66 lbs. under cost of keep | 12 54 |

If my tests are nearly correct it will be seen that there are ten animals of the twenty-eight that failed to make the 133 pounds butter necessary to pay cost of keeping them. Four of these were mature cows and six were grade Jersey heifers. The four best cows paid a profit above cost of keep of $101. The four poorest ones, all mature cows, gave a loss below cost of keep of $31. By mixing these ten non-paying animals with the eighteen paying ones, we see that No. 1 of the list, on the basis of butter product alone gave $17 more profit than all the rest of the herd save Nos. 3 and 22.

How does this test estimate compare with the churn? The sum total of my test estimates was 4,351 pounds.

The amount of butter and cream sold together with the estimated amount, butter and cream used in the family, which was 365 pounds, differed but 25 pounds from the test estimated for the year.

I have not found this test sufficiently accurate for determining the amount of butter some cows give in a day. Three tests made from 15 pounds milk well mixed gave 72-100 of a pound each, while the churn test gave fully a pound of twice worked, unsalted butter, from the 15 pounds milk. The churn in another instance gave 1.75 pounds butter from milk which Short's test showed contained but 1.42 pounds.

The results, however, in testing a whole herd for a month or a year, tally so closely with the churn yield that these differences are of minor importance, and perhaps may be due to some error in the analysis. I believe the freshest and sweetest milk analyzes best, and the drops of acid left in the bottles from the previous analysis coagulates the milk when first put into them, and the bottles should be well washed after use. I have broken two or three bottles by allowing the water in the tank to boil, and find that a degree of heat little short of boiling answers all purposes.

## WHAT WE GIRLS WANT.

By MRS. SARAH W. GETCHELL.

[Read at River Falls Institute, December 2-3.]

**A Wise Man.**

We have not come before you my dear farmer friends, to ask sealskin coats, with oats at seventeen cents per bushel, neither do we mourn for the ten dollar boots, when corn cannot be sold for 20 cents. When our hogs have to be marketed for three cents per pound we will not speak of silk hosery; no, not even of the gingham dresses we would like. 'Tis not the articles that money can buy that we want more than all else, though I presume the sound of "filthy lucre" would make a beautiful jingle in our ears if it only could get into the family pocket.

I have read: "A wise man, one who loves his wife, will not tell her all his business." Why? I ask. Are we not co-workers? What kind of a business firm would it be that kept each his own secret opinion, did each one his own

buying and selling without a word of counsel? We are not babes; we have a right to know and be consulted, and also to counsel with our husbands in all of the business of the farm, no matter how large or small.

Two heads are often so much better than one. You may be called upon while yet in active life, while your children are to be supported, to leave the business and the farm for the land where the sheaves are all garnered and there is no thought of care.

### A Business Education.

Do you stop to think how your wife, if she were unlearned in the arts of your trade, would keep the family together; she with no knowledge of the work! The land could not be sold to help her in other ways, because she who has worked a third more hours to get the home than you have has no right to sell but her paltry third. The reason that law was made was because fathers kept their daughters from becoming business women, and husbands have not helped them to broaden their education in that direction as they should have done. We hope to live to see the time, when through the justice of men, and the education of women, the wife will have full control of all property left at the death of the husband.

Girls, you need to understand your father's business, both for his sake and your own. It may keep the silver locks from fringing that dear brow if you know *just how* the money comes, and how much of it there is to be used in the family expenses. You need also to understand mother's care for her household; to take her place at times as manager, and let her go away to rest. Let the dear old hands that have labored for you, be folded in rest sometimes here. You could keep them longer with you, you know, and there will be no pang of regret when the time comes for you to take the last look on the still white face, and thoughts like these pass through your mind:

"Pale withered hand that more than four score years,
Had wrought for others, soothed the hurt of tears,
Rocked children's cradles, eased the fever's smart,
Dropped balm of love in many an aching heart;
Now, stirless, folded, like wan rose's leaves pressed
Above the snow and silence of the breast.
In mute appeal they told of labor done,
And well earned rest at set of sun;
From the worn brow the lines of care had swept,
As if an Angel's kiss the while she slept had smoothed the wrinkles quite away,
And given back the peace of childhood's day;
And on the lips the faint smile almost said,
"None know life's secrets but the happy dead."

### Home-Making.

We all need to know the business of home making; then there will be no use for the one-third law. We want a free use of the family pocket-book, whether it contains much or little, to know our husband's work as well as our own.

Now, young man, don't let me hear you say: "Yes, I guess there would not be much money left if a woman had the handling of the pocket-book."

Well, it is your own fault if you choose a wife who does not know the value of money as well as you do. If you will be careful and mind these few don'ts you will be quite apt to get a wife that will be a help to you. If you go to visit the young lady at meal time, and mother gets the dinner alone, while she sits with you — don't! If mother washes the dishes while she entertains you— don't!

If the young lady wears the better clothing, and mother takes what is left— don't.

If she does not treat her own big brothers as well as she does you—don't Choose a wife who is self-denying, and be self-forgetful yourself, and there will be even pulling on the long haul of married life.

**Help Each Other.**

Now, big brothers, I've a word to say to you. Don't leave your sisters to the care "of whom it may concern." Your sisters are only human, and if they tire of staying at home, may accept the company of young men of whom you are not altogether proud. Oh!" I hear you say, "Two is company, three is a crowd," or, "I don't go with my own sisters when I can go with other girls." Who does more for you than your own sisters?

Think twice, boys, you are in a measure responsible for your sister's welfare. We mothers all recall the thrill of delight tempered by pain when our wee baby girls are for the first time laid within our arms, there to learn their first lesson in waiting. How tenderly we hold them until they receive the needed comfort, nor do we think to chide them if they weep.

Just so surely should our larger babies find comfort in mother's arms. When your school girls come to you with a sorrow, or the first tale of childish love or some disappointment, don't, oh! mothers, say: "Oh! go along with your silly talk, wait until you are older before you talk such things." Look backward into your own life when you were as young as they; and if you are honest you will find feelings there akin to theirs.

**A Mother's Love.**

Hold them tenderly, heal their sorrows yourself with your own balm of healing. Do not let them away from you to seek comfort and guidance from girls of their own age. Let us make our daughters know that mother's love is first, last and most. Then we will fill the first great want of our girls' lives. We want most of all material things, our husbands to be always our lovers, to know that the love you were so eager to express years ago, before so many cares came to bring the silver threads, and the "crow's feet" are ours yet.

If a neighbor's wife who has much more time and money to use than your wife has, does look a little more dressy, don't say to her: I do wish you would look as neat and trim as Mrs. B—. If her daily life is so full of care that there is little room left for self-culture, do not as you sit quietly reading to yourself while she is mending the torn pants, or darning the little mittens, venture to remark, that she has retrograded, while you think you have advanced, since your marriage.

If she cares for you, instead of the sleep and rest that should come, her mind will be full of ways for improvement, her heart will hold a great pain and there will be tears on her pillow that never should have been there.

Remember, oh! husband, your sphere is as large as the world; your wife's does not reach beyond the garden gate. Your wits are constantly sharpened by whetting against other's outside, while hers grow rusty by disuse. But of all our needs, the greatest is a trust in each other, in our children; most of all in our God. "To feel and know that we may go where ere He leads the way."

## THE FUTURE FARMER AND FARM WIVES.

By MRS. M. C. OAKEY, Osceola Mills.

To the farmer of to-day in this new country, belongs the bone and sinew work of clearing and breaking the land that their children, the fu-

ture farmers and farm wives, may come into possession of cultivated and fruit-bearing lands. Those here who are already in possession of such are mostly on the shady side of life's journey. And should we ask the farmer, why are you toiling away the best years of your life to get the farm in good order just as old age comes on, he will answer: It will be a home for us old folks, and when we are gone our boys and girls will have what is left; the highest and noblest aims being for the good of their children.

Yes, the farmers of to-day are building homes for the next generation, and as you work to give them a goodly inheritance, you ought to see that they have the training that would fit them to properly fill the place; that is, give them a few lessons in practical farming, the results of your experience.

### The Country School.

The first lessons, almost, must be learned in the country school. While there are many things in them to be commended, there are also many things to be regretted, and many of the latter cannot be well avoided, while many more could be easily remedied. One of the greatest trials is the shortness of the terms, which, till we get better able to afford more school, cannot be well avoided, and for that reason a continued change of teachers, which, if the teacher be a good worker, is a great misfortune. But herein comes another source of ill. About half the teachers have no interest in the school other than drawing their salary and trying to dress in a manner to astonish the plain country folks. But the other half are the ones that the school board should try to secure. Teachers that are honest and wish to earn every cent that you pay them, for one of the very best lessons for a child to learn is to ask nothing when nothing is given.

### A Practical Education.

It is not necessary to send the boy to college to learn something that will be useful to him on the farm. I think you could count on your fingers all the farmers that are intelligent and successful that have ever attended a college or high school, but there are many useful things that could be taught in the public school. I think a few nails and a hammer and a saw would contain a lesson whose moral would help the boys in the future repair of their farm buildings and fences. Did you know that the boys and girls would take as much pride in keeping the school houses and fences in order if you would create a sentiment in that direction as they now do in tearing down and disfiguring with their knives and pencils. I remember in one school where I taught the porch got out of repair and they had some lumber there left from a coal building and two of the boys worked every noon till they had a neat porch built, and the board told them they could build a walk to the gate, the boys wanted pay for their work and said they would if the board would get us scrapers and they did so. I made a suggestion that was followed, that a few tools be bought for the boys and I never knew a board to stay off after that, they took pride in keeping up the repairs and their parents were proud of their work. Try this and see if it will not be a saving experiment. Get some crash for one-half dozen towels, they they will be a great comfort, the girls will hem them, take them home and wash them and will learn something too, I don't doubt that some genius amongst the boys would make you a roller to hang them on, and will thus learn how to make one for his own

home, and there are many useful things that a teacher whose aim is the good of the children can bring in that will give the children a respect for work and for the vocation which will probably fall to their lot.

**Exalt the Farm and Speak Well of It.**

But as the school hours are only from nine till four, there are the long winter evenings that the boys and girls are left to you after the chores are done and mother has sat down to knit or sew, don't forget to talk to the boys and girls about the things you have learned by experience, talk to them about your mistakes, and do not blame every failure to the farm, or say that every one is trying to swindle the farmers, for you only discourage them, and they will think that the farm is a poor place, and farmers are abused nobodies, but if you ever do get discouraged and feel that way, do not say a word to the boys, but go visit some of us that do not live on a farm and see if you are living off the fat of the land. I think we will go home more encouraged, and advise the children to stick to the farm.

We must not forget that the life is more than meat and the body more than raiment, and aside from being successful home-builders our boys and girls are going to be the society and law makers of the future and their place in society will depend much on the home training and influence. There are few of us that do not want our children to stand amongst the educated and intelligent citizens of the coming day and there are a few that are able to give them college educations. But in this day where a good paper can be had for a whole year for $1, once a week, we ought to all take at least one and talk to the boys and girls about the news, get them familiar with the workings of the government, and with manufactories and industries. It will give them a patriotic love and respect for their country. They will have such an understanding of its needs that it will not take a smooth-tongued polititian and perhaps a glass of larger beer to secure an intelligent vote from them.

**Good Books and Magazines.**

Good books were never so cheap as now. I have a catalogue where many of the best authors well bound can be bought for 30 cents. Get good story books for them when they are young and as they grow older they will develop a taste for good reading, just think, for three drinks of whisky (if any farmer ever does indulge in such) you could buy a book which would cause enjoyment to yourself and your entire family for a good many long evenings, and be a lasting benefit to all.

There is one thing to be careful about and that is these trashy magazines that send out chromos to catch subscribers. I do not blame you for wanting the pretty cards for the boys and girls, and I believe the love of the beautiful is their higher and better nature coming out. But go to the store and buy them the cards and for the dollar which the magazine will cost you can get the cards and two or three good books, but do not let your boys and girls waste their young lives over the hair-brained adventures of imaginary people who could never exist. It makes real life a burden to them. It is hard to peal potatoes for mother, after having been decked in diamonds and laces with Augusta Angelina. And much of a man's standing depends not only on the intellectual, but his moral make up.

Just imagine the rich man that is sordid and mean in his dealings with his fellow men. Be he ever so well educat-

ed no one ever respects the man that respects no one but himself. So do not point out the faults of the wrong-doers but emulate the good qualities of the successful ones, and make the boys and girls feel that honor and virtue will surely be rewarded.

As we are looking at the man who is lying drunk in a ditch there are few of us, although we may frequent the saloon, that would not almost rather bury our children than see them thus. And let's be honest with them and tell them the dangers of dissipation and excess in not only the saloons but other places where there is no good and much of evil. What we want most is not so much a harder working class to fill the place of the present farmer, as a class that will rise up and do justice to their parents to requite for the anxious care they have had for them.

The farmer of to-day is doing a grand and noble work for those that will come into possession of their homes after they have gone. And even though they may make some mistake in the sowing of the seed, I doubt, not in God's good time, the harvest will bring forth golden fruit and our boys and girls, the future farmers and farm wives, will shine forth as the stars in the firmament.

## WHAT SHALL WE READ?

BY MRS. M. MCCOY.

[Read at Belleville Institute, March 18-19.]

Education and Progression.

We are told by a great philosopher that "A little learning is a dangerous thing," and to avoid the danger we must increase the knowledge.

It is of vital importance to all students, how they can best attain to a thorough knowledge of life, and acquire an education necessary for the discharge of the duties which every human being owes to each other, and the facilities now within the reach of all the inhabitants of these United States for so doing, is beyond, far beyond, anything our ancestors dreamed of. But those who from age or lack of sufficient means cannot afford, or avail themselves of those priviliges provided by the State, in our colleges have the blessed privileges of reading and studying the books, which are accessible to all so "what shall we read" is the subject under consideration this evening.

Among so great a variety of books it is very difficult to make a good selection, but as we farmers are supposed to know very little of book lore, we can choose a few of the best, which will be sufficient to enlarge our ideas of God, man, the world, and illimitable space, and to even take a peep into some of the sciences.

### History.

First, let us look at history. And beyond all comparison we place the book of books (which it is presumed the inhabitants of Green county are conversant with) above all other history in point of time or authenticity, as an able writer has said: "It has God for its author, salvation for its end, and truth without any mixture of error for its matter."

And from this highly inspired pinnacle we step down to profane history. Giving age precedence we have as accessible to all readers, Rollins' Ancient History. The style in which it is written makes it most pleasant to the general reader, and is in many parts like a work of fiction for readableness.

History enlarges one's ideas of the ancient world, and we owe much to

those historians, who to fit themselves for their work must travel and find out all about what they write, about the colonies, who started them, what led those colonists from home, why the Persians came, what they believed, what countries they attacked, and of Egypt, what about its sources, rivers, soil. About their gods and their belief, that all events were under the guidance of the gods, so, we learn that there is an instinctive consciousness of a supreme being in every human breast. As every American should be interested in the history of his own county. Bancroft's history of America ought to be within the reach of all.

But to know how other nations were governed we must consult those which are notable for reliability, among which are Humes' History of England, and Gibbon's Decline of Rome. Humes' is perhaps too voluminous for the average reader, who likes to have everything condensed, as it were in a nut shell. Gibbons is very readable and reliable, but sometimes sneeringly suggestive of skepticism. Then we have an excellent history of Greece, by Grote, and of the French Revolution by Carlyle, and of the south of Germany by Yonge, but we had almost forgotten the facile Macaulay, whose History of England is so fascinating.

### Biography.

We next glimpse at biography, and we must adjudge the foremost place to "Plutarch's Lives." If you want to know of the great orators, statesmen, soldiers, rulers of the ancient world, the kingdoms of Greece and Rome, by all means read "Plutarch." It is very profitable to read the "lives of great men. They remind us we can make our lives sublime," and the lives of such men as Baxter, Bunyan, Luther are a great help to stimulate spiritual life.

Then we have Boswell's Life of Johnson; Boswell, prince of biographers.

Next looms up the great prose writers of fiction of more recent times.

Scott must be awarded the post of honor. His novels, historically, cover a period of 200 years, and who near his last said he had never written a line which he would wish erased. His purity, humanity, and generosity, endeared him to all his acquaintances.

Dickens, whose works were the means of directing the attention of the "Powers that be" to the terrible state of gaols, work houses, and tenements, in fact, to everything that would ameliorate the distress consequent on poverty, and made the wealthy and selfish to see the need of reform, and caused the thinking people of London to think and act for the down-trodden, degraded habitue of the slums of his great city, his works are a benefit to the human race.

Every age has had its marked phases. The civil war in England brought out such men as Jeremy Taylor, John Milton, John Bunyan, and their work remains and will endure while the world lasts.

Luther and Melancthon were the offspring of the reformaton, and we owe much to it for the books we now enjoy.

A book to be beneficial must be a truthful delineation of the times, and must be essentially human, and we must trace the influence of Scott's works to his recognition of the sympathetic in common life. Our day has made an advance in this line, we have annals that enter into all the bearings of discipline in forming men and events, which make a true history of the times, and those who would benefit the race must be keen observers of men, and enter into their

forms of life and society, and those books which live through the ages are those which connect themselves with human life and action.

**Good Books, An Inspiration.**

Every good wise book helps us to understand the world, or God, better. There are many who prefer sentiment to humanity, and they will meet with authors, who seeking a temporary reputation, later to their appetites, but such works are short-lived.

The beginning of the present era had many noble minds, and some, though pagan, entertained ideas far ahead of their times and a perusal of their works, though only translations, will repay the student. Books can only be profoundly influential as they unite themselves with decisive tendencies—our society has a great influence for good or bad on us. If we move in an atmosphere of good, pure books we get the very best society, needing no introduction, and can meet them at leisure unchanged and unchangeable. Such names as Bacon, Erasmus, More and others, rise in our minds as superior to the average intellect, and every age has its own typical life stamped indellibly on its institutions.

It is pre-eminently fortunate when the contributions to one's life comes from sometimes opposite and remote points, so the stream is kept fresh and full by distant yet converging tendencies.

**Modern Authors.**

We cannot omit our modern female authors as Hannah More, Charlotte Bronte, George Eliot, Mrs. Phelps, Mrs. Stowe, Miss Willard; but their names are legion who have battled for temperance, purity, freedom, and all that ennobles home life.

I need not name theological works, as each branch of the Christian church has its favorites in doctrine—some Armenian, others Calvinistic, and some like Mrs. Ward's Squire, who would like a Christianity without a Christ, who had men of straw created for him to knock down, a dishonest, misleading and unfair manner of debate.

Youth is so susceptible that parents should use all caution in regard to what is admitted to the home, and no questionable literature should be admitted. In reading we should use discrimination, diligence, and earnestness; we should read for facts—quality of matter is the main string. We can be at no loss in these days for variety in books. Do we want a "feast" of wit or "flow" of humor, we have only to take up Swift, or Lamb, or Wordsworth, or Goldsmith, or Irving, whose Knickerbocker, etc., is matchless for humor, and his Sketch Book unparalleled for beauty of description and pathos. Cervantes, too, whose Don Quixote served Chivalry, as did Mrs. Stowe's Uncle Tom's Cabin slavery. Then we have the immortal dreamer, whose Pilgrim's Progress, which has been translated into every European language, thrills us with a view of the Christian's course from the slough of despond to the pearly gates and golden streets of the New Jerusalem. We dare not omit the imaginative De Foe, whose immortal classic, Robinson Crusoe, considered by many as only fit for the young, and never think of reading it in mature years, yet if they did would find more religion, philosophy and political economy than in some works which bear the name. Johnson's Rasselas, and Goldsmith's Vicar of Wakefield, have long been classed among the best English classics.

Eber, Ware and others who have

written on Egypt, Greece and Syria convey through good fiction solid truths of the habits, institutions, and life of the people they portray. Books are a power at work, silent but impressive companions, and in the retirement of our rural homes have through them and a healthy press, nutritious food for our children's intellectual and moral growth.

#### Poems of the World.

As we desire to aim at knowing the best, we turn with pleasure to greet those who have long been adjudged as the greatest poems of the world.

First in point of time and matter Carlyle, that great thinker, but dyspeptic pessimist, places the Book of Job for sublimity and grandeur of description.

Then we name Homer's Iliad and Odyssey, Virgil's Anead wherein the boys can read of the affection Aneas bore to his aged father, by carrying him on his back out of burning Troy, though by the transaction he lost his wife.

Next comes Dante, that superb Italian poet of the thirteenth century, whose "Divine Comedia" has had cosmopolitan fame.

Tasso, also Italian, of the sixteenth century, whose "Jerusalem Delivered" has fed the soul of many a scholar, with "thoughts that breathe," and tells of his restless energy in the race after fame.

The unrivaled Shakespeare, whose knowledge of human nature was unbounded.

Then Pollock's "Course of Time" which was dear to many of the past generation.

Young and Thompson are still read with pleasure. Byron's "Childe Harold" and Moore's "Lalla Rook;" Gray, especially his "Elegy;" Bryant, Longfellow, Tennyson, Burns, all these are good poets, but none of them will give the boys more pleasure than Scott's "Marmion" and "Lady of the Lake."

#### Books of Travel.

In travels we can scarcely make a selection. There are so many well written descriptions of foreign lands, and so felicitous in style that the most exacting taste must be satisfied.

"Views Afoot," by Bayard Taylor is very interesting; but we have exceeded our limits, and yet only mentioned a few of the many that might be read with profit, and to sum up all, if you will own a good encyclopedia, a Webster's, unabridged, a family Bible containing a Smith's dictionary, Young's concordance and the many tables chronological and informatory on different subjects, you will be well instructed in all matters of essential importance, and you will have no time or desire for yellow-backed literature.

## THE BUSINESS FARMER.

BY C. W. STAPLES.

[Read at Osceola Mills Institute, Nov. 26, 1889.]

#### Looking Upward and Onward.

In speaking on a subject of which you know but little about, it is much easier to criticize than it is to advise, hence I will attempt to criticise the average farmer for not earning and wearing the title of this essay, and perchance throw in a little advice on the side.

There seems to be enough advice afloat from good and reliable sources, but there also seems to be a backwardness toward accepting anything but those old tried methods, that have proved good in their day, but are entirely inadequate to the needs of the modern business man, and right here

seems a slight mistake, the farmer is not generally known as a business man, the term does not seem to apply to him; and no doubt you noticed that it sounded somewhat far-fetched in the former sentence. We say that a person is a good business man when he not only accepts and tries new approved plans and methods, but throws his individuality into his business, and conducts it in a little different manner than his competitor, he buys as cheap as he can and sells as cheap as he can afford, in fact he tries to undersell his neighbor. How often do you hear of a farmer trying to undersell his neighbor? His word is as good as a bank note and his advice and influence is respected in the whole community. Such a man, we call a good business man, and when a farmer (and there are many such) conducts his farm in a similar manner, he, too, becomes a good business man and usually a successful one. The farmer is to blame for this distinction between men engaged in mercantile pursuits and those engaged in tilling the soil. The difference is only imaginary, and the only way to remedy the imagination is by not only "looking backward," but by looking upward and onward, in earning the title and wearing it with professional pride.

### "Who's to Blame?"

I have known farmers to spend more money for books, papers and periodicals each year than they did for tobacco, cigars and whiskey. How many do you know that do the same thing? Not many. Then "who's to blame?" if the farmer is not generally known as a good business man.

A judicious investment in this line will bring you in far greater returns than you may at first suspect. No man can make a success at anything now-a-days unless he invests in printer's ink, and the amount of work accomplished in his toil will be far greater for the moments spent in papers devoted to farm work. The household work will be far lighter if the magazine makes its weekly visits in the library, and the chores make light work for glad young hearts when the round table is replenished with fresh and wholesome reading matter every few days.

I have also known of a farmer who sends his boy, a good, strong lad of sixteen summers, into the field to work along side of the hired man, and expected that the boy would perform as much work for his board and clothes as the hired man did for one dollar a day; and then when the day was done, the boy must do considerable more than his share of the chores and run on errands about the place until long after bedtime. Oh, what a blessed privilege it is to be *such* a boy on *such* a farm.

Mothers and daughters, also, do the work incident to the household, taking care of the yard and garden, for their board and clothes, while at threshing time father hires a neighbor's girl and pays her seventy-five cents for doing about half the work the daughter does every day in the year. No wonder the life of the farmer's daughter has been praised in song and verse, and that the beautiful girl clings so tenaciously to the old homestead. Don't make such a mistake; pay the boys and girls for their work; pay them according to their worth; pay them promptly as you agree, and let them do as they choose with their earnings. More farmers' sons would succeed the father in business and farmers' daughters would be better satisfied with their lot as farmers' wives, if the latter plan be adopted.

**Impractical and Unremunerative Methods.**

There is but little reason, justice or judgment in the present system of educating the boys to succeed as on the farm; and the failure of the system is shown by the number of boys who are anxious for anything but the farm, and the girls are also dissatisfied with the farm as a home.

I have known farmers who never paid the land for the crop it gives them year after year; they took off all they could get, but never put a cent's worth back in the way of fertilizers, and then even wondered why they don't raise as much wheat or potatoes on an acre as they used to, when the greaest and only wonder is, that they can get anything off of land that has labored so long for not even board and clothes, we might as soon expect our land to give us a crop without proper fertilizing, as we would our binder would cut our harvest without oil; one is as essential as the other. If you haven't enough manure to properly keep up the farm, and the crop does not warrant buying, then sell a piece of land and buy stock with the proceeds, and thus make the supply equal to the demand. You may steal ten dollars from the land in the spring but it will cost you twenty dollars by fall, and is far better to be honest and pay for what you get in this line as well as any other.

I have actually seen farmers who didn't have time to clean up their door-yard, fix up a piece of lawn or set out a few shrubs and shade trees; but they *did* have time to go to the village every day or two to play a game of cinch at the corner saloon, or gossip with the horse-trader an hour down the lane.

Does a business man think he can do business in a slovenly, dirty shop? If so he fails and finds out that his customers have gone over to John Wideawake, a progressive and thoughtful competitor.

**The Usual Surroundings.**

Poor fences, a littered door-yard, no trees or flowers, the little scraggy wood-pile lying at loose ends about the place, all betoken shiftlessness, laziness and illiteracy. Hang out a better sign if you would be classed with business men. A good business man never misses a chance to better his trade or condition by the experience of others, he studies closely the trade journals, and the new methods of advertising; he attends the conventions and belongs to the associations that are held for the benefit of his trade. But how is it with the average farmer, he rarely attends and takes but little interest in the county fair, but leaves the horse jockey to manipulate the management to his advantage, he has no time for the farmers' club, but leaves the routine work of that and preparing for the institute to a few enthusiastic villagers who have no direct interest therein. What other class of business men, when meetings are gotten up for their benefit would allow another profession to come in and transact the business of the meetings? Surely we know of no other, but it is a common thing all over our land to see agricultural associations and farmers' clubs, managed by those outside the farm.

I have known a business man—no, a farmer, who had a thousand dollars' worth of machinery exposed to the weather, hunt an hour for a twenty-five cent jack-knife that he had lost.

Now, this is not an absurd comparison, but a true one, and if he had worked that hour putting up a shelter for the thousand dollars' worth of machinery, he could have bought him a bran new one dollar and a quarter knife with his savings.

I have known farmers who claimed that they are too poor to provide shelter for their cattle, and so let them run to the straw stack for fodder, seek shelter on the shady side of a barb-wire fence, and drink ice water to quench their thirst, during our cold and severe winters; by a little fore-thought and the farmers' journal, they can see that shelter and warm water costs nothing, comparatively, except a little labor; that to keep stock warm saves 15 to 20 per cent. of the fodder, and that it is unnecessary for cattle to run out for exercise in this cold climate. The increase in the value of the herd could be directly traced to the farm journal or the Farmrs' Institute, which give us theory and experience far cheaper than we can get it ourselves.

**Intelligence and Application Bring Success**

There is no business that will succeed when the manager does not put all his time, energy and thought into it every day counting three hundred and sixty-five days to the year.

No business will thrive when the manager is continually telling that it does not pay—that he is running behind—that he is heartily sick of his business—and wishes he could find something else to do. A man must like his calling before he can expect any valuable returns therefrom; and those who are lukewarm to their own interests, will find it far more congenial if they would take off their coat occasionally and help sustain the county fair, the farmers' club, the institute work or any other means by which the farmer may gain knowledge without the slow, tedious and sometimes expensive, "actual experience." Every business farmer should be progressive and alive to the needs of his profession, and to the demand of the times; by so doing he can bring up the standard of the farmer, and be able to wear with distinction and pride, the title of o good business man.

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## IMPROVING SANDY LANDS.

By W. R. Barnes.

[Read at Friendship Institute, January 21-22.]

**Push, Clover, Fertility—Success.**

When we purchased the land on which our homestead stands, which is a sandy soil, or clear sand as most folks would call it, the part which was under cultivation was so exhausted with poor farming that many people thought it utterly worthless, and when, in the second year, we put up a large barn, 36x45 feet, our neighbors laughed and wanted to know what we were going to put in it. We told them that we would fill it with black oak brush if we could find nothing better.

Knowing but very little about a poor, sandy soil, coming as we did from the rich, black soil of Racine county, we had but one thought, and that was that the success or failure of a man was in the style of farming he practiced, and I am still of the same opinion. A man cannot make a success of farming, either on clay or sand, and be half of his time sitting on a dry goods box smoking cigars and drinking beer, unless he has more brains than the most of folks. Common sense taught us that we could not get something out of nothing; but we firmly believe that such land could be made productive by putting on manure, sowing buckwheat or rye and turning it under when green, sowing clover, and following with a thorough rotation of crops. The result has been that the land under our system of farming has been gradu-

ally improving during the seventeen years we have been upon it, and the yield per acre as great or even greater than upon any clay farm with which I am acquainted. Our potatoes this year yielded 415 bushels to the acre; our corn 170 baskets per acre; barley 50 bushels per acre; oats 60 to 80 bushels per acre; clover, medium, 4 bushels, and mammoth 5 bushels of seed per acre, and sorghum syrup at the rate of 200 gallons per acre.

### Conserving Fertility.

Looking forward to clover as the principal agent in improving the soil we had first to do something to make the clover grow. For this purpose we plow deep, and sowed buckwheat early, and then turned that under when in full bloom. Plowing under old hay or starw or rye when green would answer the same purpose. Then we sowed clover and got a fair start in the way of improvement.

Mammoth clover is much the best kind for restoring fertility to exhausted soils, and great care should be taken not to sow too much seed. Having the largest kind of clover, and so thin on the ground that each plant has room to do its best, then the roots are large and penetrate to a great depth, finding plant food at a far greater depth than it reached by any other crop and bringing it to the surface. Then when that clover is plowed under the top soil is enriched with all the best elements of plant food without the disadvantages of a clay soil.

One of the best materials for enriching sandy land is fresh coarse barnyard manure, when you have plenty of it, the coarser and greener the better it is, as it takes more time for it to rot and leach away, also holding the moisture and making the land less liable to dry and burn with the heat of summer. If you put well-rotted manure on sandy land you need not expect much benefit from it as it will all be used up the first year so do not leave your manure to lie a year or two in your barnyard, but clean them out every spring and every fall, and give your land, and not your barnyard, the benefit of it. And mind, you spread your manure as you haul it, so that every part of the land receives equal benefit. It pains me to see a man waste his strength, waste his manure and spoil his land by leaving his manure in piles three or four months. There will be a patch about four feet sqnare where the crop will fall down and rot, and the best of the ground will look as if no manure had been spread on the field.

But as the quantity of manure on the farm is always limited, clover comes in as the farmer's best friend, on which he must place his chief reliance for enriching his soil, and it is equally adapted for both clay and sandy soils. It possesses the most nutritive properties for the feeding of stock. By growing it you can keep more cows, horses and hogs, all yielding present profit and making an abundance of manure for the future, and when you plow it under, the rotting of the whole plant, including the roots, makes the soil in the best possible condition for every kind of crop.

### Clover, Hogs and Dairying.

As farmers here are turning more of their attention to dairying since we had such a prosperous and well conducted cheese factory in this village, they will find clover the very best pasture for producing the largest amount as well as the best quality of milk, and it is also the best pasture for the hog, we may assert that it is, on the whole, the most profitable crop on the farm.

Our sandy soils should be kept in a good state of cultivation from the start.

For this purpose have a regular rotation of crops. When clover sod is broken up it should be followed by a clean, hoed crop and then seeded down again with clover along with the following crop of small grain:

On exhausted, sandy soils the firs start in improvement is the most diffi cult. As I said before, put on all the manure you can scrape up, sow buckwheat or rye and plow under when in full bloom; and to still further insure a good stand of clover, sow equal parts of salt and land plaster, 100 pounds of each to the acre at the time of seeding the clover.

Before plowing up a clover sod cover it well with manure, either in the fall or early spring, and leave it as long as possible before plowing, so that the clover gets a good start, and you have quite a crop of green clover to turn under. This causes quick fermentation and decomposition of the whole clover plant—roots and top—and gives the corn or potatoes an early start and a vigorous growth; then let the cultivator and hoe be freely used, allowing no weeds to grow, and you are pretty sure of a good crop, whatever the season may be. Follow the next year with wheat, oats or barley, seeding down again with clover.

I consider clover seed a profitable crop to raise on sandy land, as the few bushels of seed you get takes almost nothing from the soil, and the rotting of the straw and the roots of the clover add an immense amount of fertility to the soil. I would, in conclusion, say to the tillers of sandy farms—Don't get discouraged, but go at it with a will to win; put on your manure, sow on your clover, and attend well to the growing crop, and I have no fear of your success.

# BREEDERS' DIRECTORY.

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Short-horn Cattle and Berkshire Pigs.

**ARNOLD, LEVI—** PLAINWELL, MICH.
Jersey Cattle (A. J. C. C. H. R.), Registered Merino Sheep and Poland China Swine.

**ADAMS, H. C.—** MADISON, WIS.
West Lawn Herd A. J. C. C. Jerseys. Pure St. Lambert bull at the head of the herd. St. Lambert, Alphea and Omaha blood finely represented.

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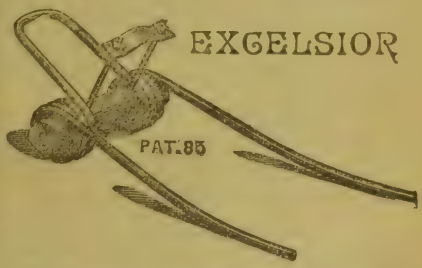
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| | |
|---|---|
| Lines of the Chicago, Milwaukee & St. Paul R'y | 1,310.09 |
| Lines of the Chicago & Northwestern R'y | 946.55 |
| Lines of the Wisconsin Central Associated Lines | 641.47 |
| Lines of the Milwaukee, Lake Shore & Western R'y | 571.57 |
| Lines of the Chi., St. Paul, Minneapolis & Omaha R'y | 553.86 |
| Lines of the Minneapolis, St. Paul & Sault Ste. Marie R'y | 266.85 |
| Lines of the Milwaukee & Northern R'y | 254.50 |
| Lines of the Chicago, Burlington & Northern R. R | 230.50 |
| Lines of the Green Bay, Winona & St. Paul | 221.80 |
| Lines of the Illinois Central R. R | 91.31 |
| Lines of the Northern Pacific | 84.30 |
| Lines of the Duluth, South Shore & Atlantic | 67.98 |
| Lines of the Sault Ste. Marie & Southwestern | 26.88 |
| Lines of the Milwaukee, Dexterville & Northern R. R | 25.40 |
| Lines of the Eastern Railway Company of Minnesota | 20.70 |
| Lines of the Wisconsin, Pittsville & Superior | 20.29 |
| Lines of the Chicago, Fairchild & Eau Claire River | 16.00 |
| Lines of the Milwaukee, Menominee Falls & Western | 14.60 |
| Lines of the St. Cloud, Grantsburg & Ashland | 12.00 |
| Lines of the Menomonie R'y | 5.02 |
| Lines of the Goodyear, Neillsville & Northern R'y | 5.00 |
| Lines of the Duluth Short Line R'y | 1.94 |
| Lines of the Prairie du Chien & McGregor | 1.75 |
| Total mileage | 5,390.36 |

# WISCONSIN AGRICULTURAL RESOURCES

## SIXTY-EIGHT COUNTIES.

| | | | |
|---|---|---|---|
| No. of farms | | | 141,675 |
| Acres of improved land | | | 8,115,333 |
| Acres of unimproved land | | | 4,583,715 |
| Acres of wood land | | | 3,660,198 |
| Value of farms | | | $415,000,000 |
| Value of farm implements | | | $15,997,989 |
| No. of swine | 1,596,200; | valued at | $5,102,376 |
| No. of cattle and calves | 1,843,899; | valued at | $28,062,598 |
| No. of sheep and lambs | 1,429,137; | valued at | $2,353,015 |
| No. horses and mules | 498,132; | valued at | $41,049,563 |
| No. of cows | 700,000; | valued at | $15,237,468 |
| Pounds of butter | 50,000,000; | valued at | $7,500,000 |
| Pounds of cheese | 45,000,000; | valued at | $4,000,000 |
| Bushels of wheat | 12,683,983 | | |
| Bushels of corn | 38,058,857 | | |
| Bushels of oats | 48,293,415 | | |
| Bushels of barley | 15,502,443 | | |
| Bushels of rye | 5,049,784 | | |
| Bushels of potatoes | 13,492,108 | | |
| Bushels of apples | 1,903,699 | | |
| Bushels of cranberries | 289,145 | | |
| Bushels of strawberries | 76,975 | | |
| Bushels of clover seed | 61,371 | | |
| Bushels of timothy seed | 101,960 | | |
| Value of agricultural products annually | | | **$135,000,000** |
| Value of manufactured products annually | | | **$200,000,000** |

# WISCONSIN PUBLIC SCHOOL STATISTICS.

## ADMINISTRATIVE.

1 State Superintendent.
42 City Superintendents.
70 County Superintendents.
43 Boards of Education.
6,104 School District Boards.
1 Board of Regents of the State University.
1 Board of Regents of Normal Schools.

## SCHOOLS.

University of Wisconsin and Agricultural College.
5 State Normal Schools.
165 Free High Schools.
817 Graded Schools.
5,931 Ungraded Schools.

## RESOURCES.

| | | |
|---|---|---|
| *Annual Income of* | | |
| State school fund | | $193,820.70 |
| University fund | | 15,241.35 |
| Agricultural college fund | | 14,512.26 |
| Normal school fund | | 85,364.58 |
| *State Tax for* | | |
| Common schools | | $577,092.82 |
| Free high schools | | 50,000.00 |
| State university | | 71.653.76 |
| *Productive Fund of the* | | |
| University of Wisconsin | | $187,948.32 |
| Agricultural college | | 229,660.00 |
| Taxes by counties, cities and districts | | 3,559,666.39 |
| Value of school property in the state | | 8,898,603.00 |
| Number of persons of school age (4 to 20) | 577,123 | |
| Number of teachers required | 8,218 | |
| Number of Teachers' Institutes held (in 67 counties) | 91 | |
| State tax for Teachers' Institutes | | 2,000.00 |
| Productive fund of normal schools | | 1,473,243.55 |

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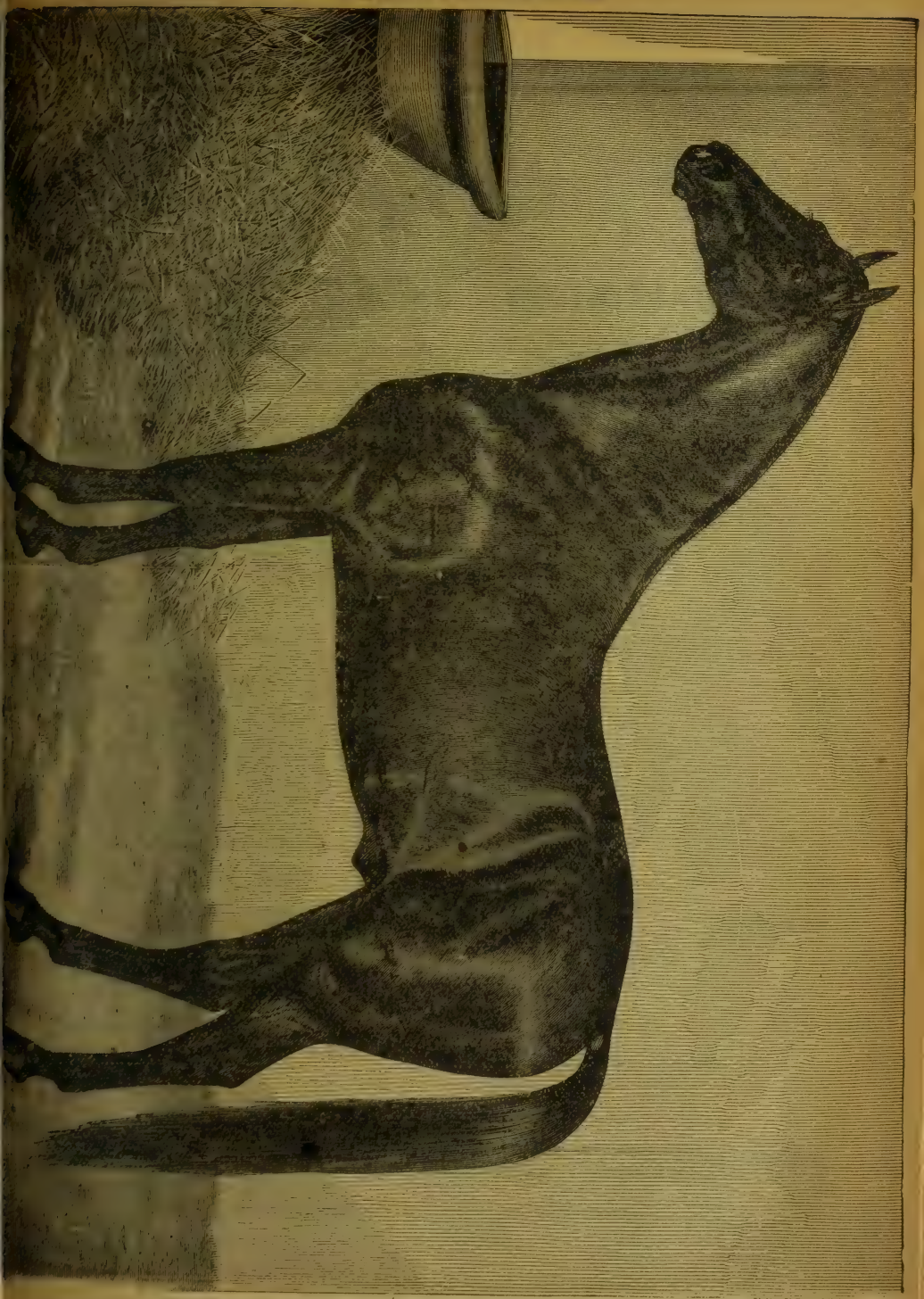
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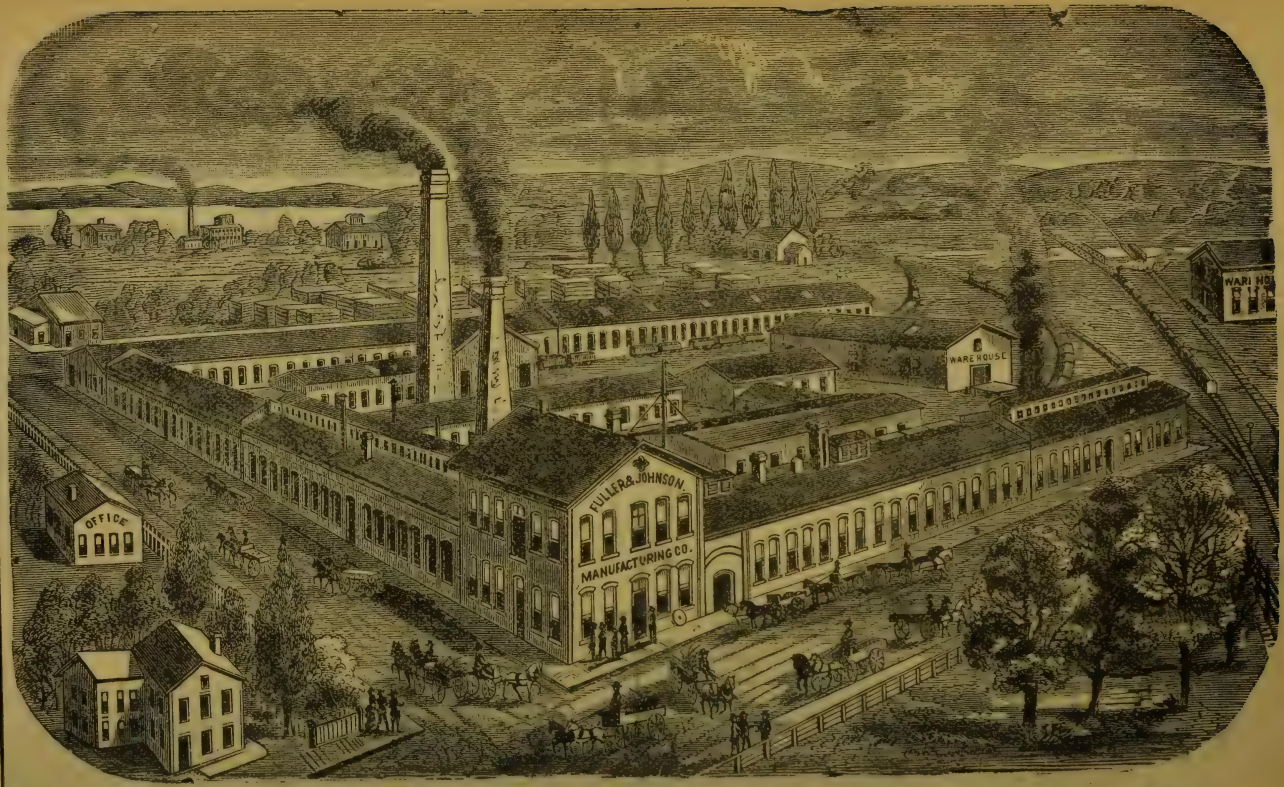
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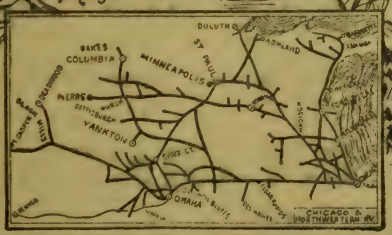
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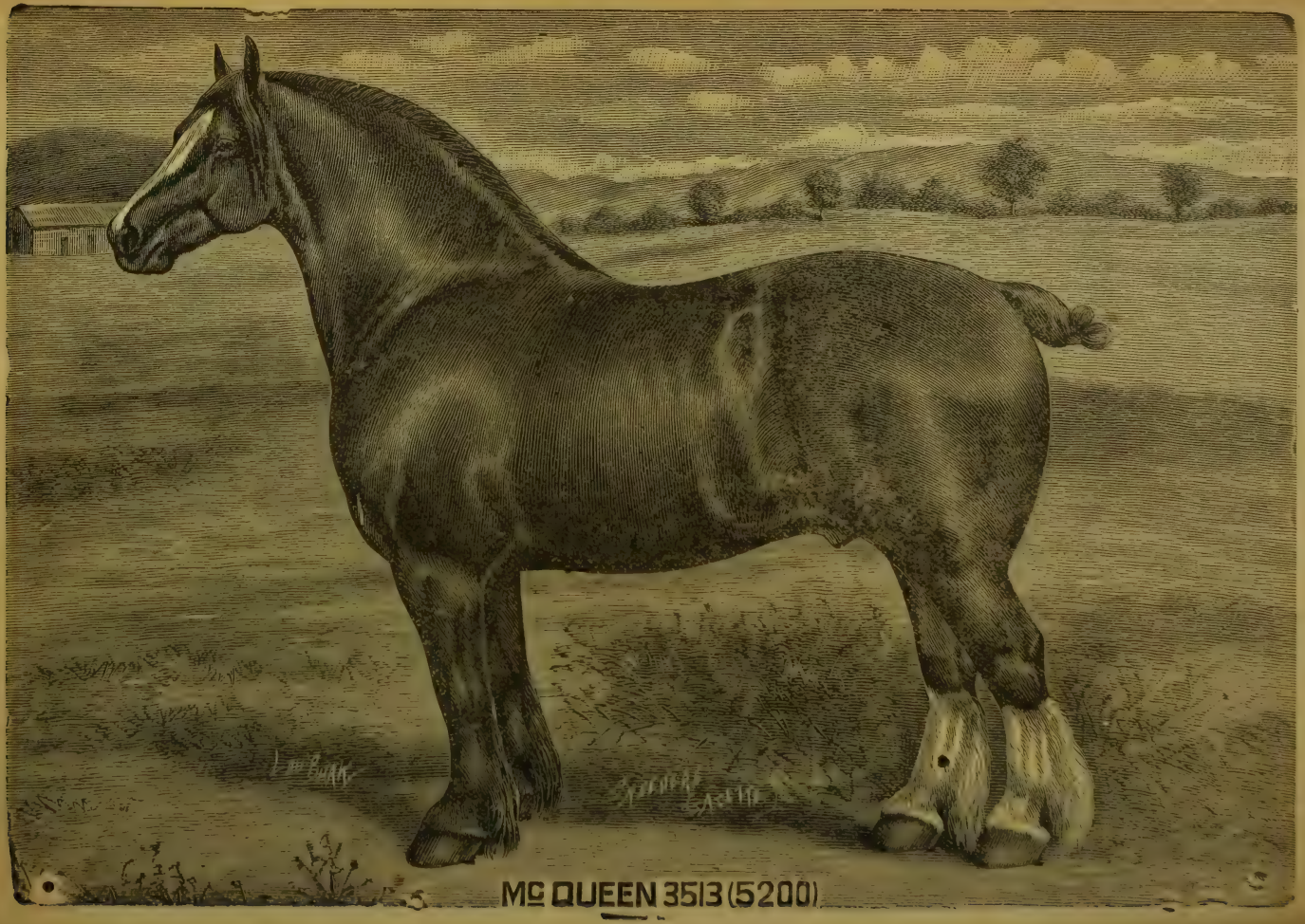
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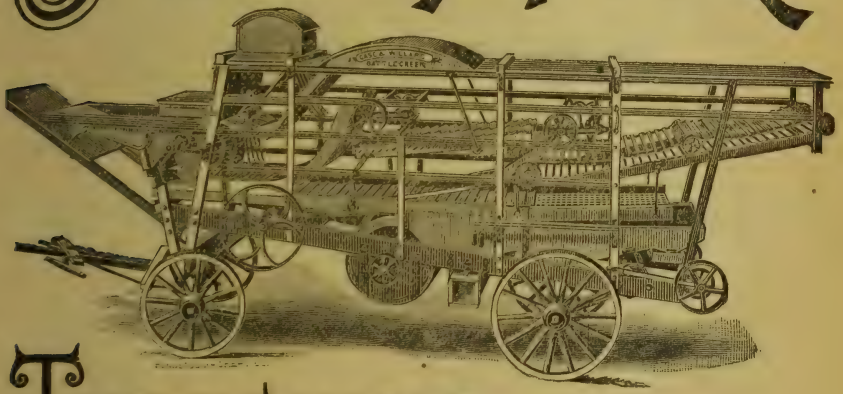
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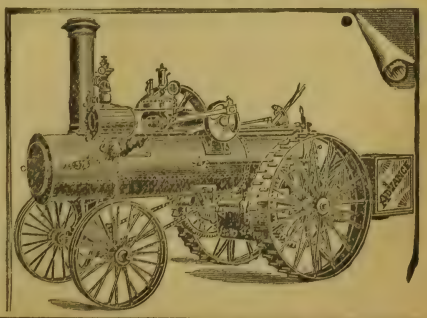
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**PROPERTY OF JOHN L. MITCHELL.**

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ALFORD, by Nutwood (2.18¾); Dam, Alta (2.23¼), by Almont.

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At the head of the Jersey herd stands the bull HARRY'S RIOTER, bred by Campbell Brown, of Tennessee. Sired by Nancy's Rioter, out of Queen Mary, a cow tested at the rate of 18.02½ pounds of butter to the week.

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# BERKSHIRE HOGS.

## RECORDED CATTLE

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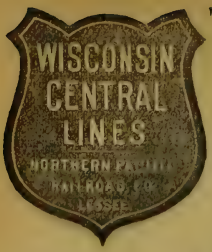
The Short-horn is standard for beauty and utility and the most valuable breed for the average farmer.

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## Pullman Vestibuled AND Colonist Sleepers

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— AND THE —

# PACIFIC COAST

— VIA THE —

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## Without Change of Cars.

THE FAVORITE ROUTE BETWEEN

## CHICAGO AND MILWAUKEE

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Waukesha, Chippewa Falls,
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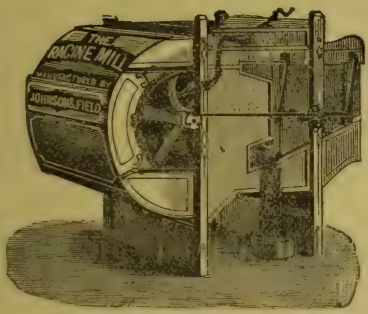
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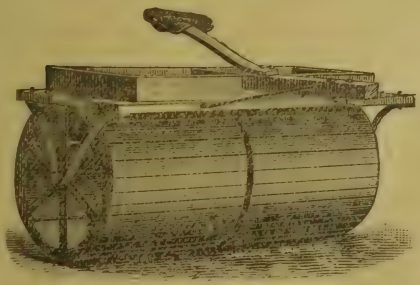



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*The Best, Cheapest and Strongest Land Rollers in the Market.*



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Patronize Home Industry and Get Acclimated Stock.

MY MOTTO:

**LIVE AND LET LIVE,**
**PLANT A TREE AND MAKE IT LIVE.**

A FINE STOCK OF

## WAUPACA COUNTY SEEDLINGS.

Give me your patronage, and I will instruct you How to Plant, Cultivate, Prune and Protect.

**All Mail Orders Will Receive Prompt Attention, and Satisfaction Guaranteed.**

WAUPACA, = = WISCONSIN.

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# WIND MILLS, PUMPS, TANKS, HAY TOOLS, ETC.

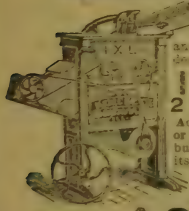
35 Years Experience.

## EVERY FARMER HIS OWN MILLER

**Do your own Shelling and Grinding at Home,** saving tolls and teaming to and from the Grist Mill. This work can be done rainy, windy days, when out-door work is suspended on the farm. The same Mill will cut corn stalks, saw wood, run churn, grindstone, pump water, etc. We make the

**HALLADAY GEARED WIND MILL**

in 11 sizes, ½ to 4c horse power, and GUARANTEE they have no equal for Power, Durability and Storm-Defying Qualities.



## Horse Powers

and JACKS both single and double geared, heavy and strong.



## IXL CORN Sheller

2 HOLE

Adapted to run by hand, horse, steam or wind power. Not cheaply made, but strong, durable and effective in its working, yet light running. It is constructed similar to the large Power Shellers, and is the best 2 Hole Sheller on the market.



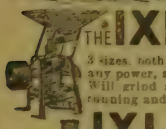
## SAW TABLES

Both Swinging and Sliding Tables. We make a Saw Table especially adapted to sawing long poles. Special care is taken to make these machines strong and durable.



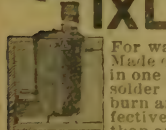
## THE IXL STALK CUTTER

made in 5 sizes, with **Safety Fly Wheel, Safety Lever,** and all late improvements.



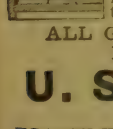
## THE IXL IRON FEED MILL

3 sizes, both Belt and Geared Mills. Can be run by any power, and especially adapted to Wind Power. Will grind any kind of grain, and is the lightest running and most effective Feed Grinder made.



## IXL TANK HEATER

For warming water in Stock Tanks. Made of the best quality of iron cast in one piece, no sheet iron to rust or solder to melt and cause leak. Will burn any kind of fuel. It is very effective and takes less care to operate than any other Heater made.



35 YEARS Experience

## WIND MILLS

### THE HALLADAY MILL

is acknowledged the **Standard Wind Mill of the World,** and is made in 18 sizes, 8 to 60 ft. diameter, 1 man to 40 horse power. It is adapted to pumping water for Stock and Dairy Farms, Ornamental and Village Water Supply and Fire Protection, Railway Water Stations, Irrigation, Drainage, Etc.

**THE HALLADAY** is made upon honor and guaranteed **The Most Powerful, Durable and Best Regulated Storm-Defying Wind Mill** on the market.



## U. S. SOLID WHEEL

And STANDARD VANELESS

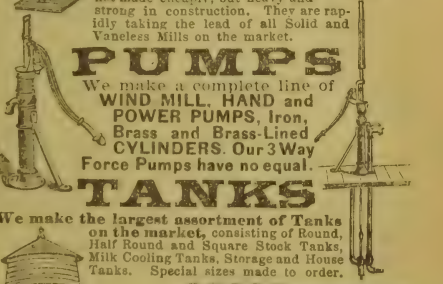
## WIND MILLS

These Mills are **guaranteed the BEST** of their class. Are not made cheaply, but heavy and strong in construction. They are rapidly taking the lead of all Solid and Vaneless Mills on the market.



## PUMPS

We make a complete line of **WIND MILL, HAND and POWER PUMPS, Iron, Brass and Brass-Lined CYLINDERS. Our 3 Way Force Pumps have no equal.**



## TANKS

**We make the largest assortment of Tanks on the market,** consisting of Round, Half Round and Square Stock Tanks, Milk Cooling Tanks, Storage and House Tanks. Special sizes made to order.



## STANDARD HAY TOOLS

**For stacking out in fields and mowing away in barns.** The use of a good **Hay Carrier and Fork** a few hours before a storm may save many times their cost. We make the most complete line of **Horse Hay Tools** on the market, consisting of Anti-Friction, Swivel, Reversible and Rod Hay Carriers, Harpoon and Grapple Hay Forks, Pulleys, Floor Hooks, etc.



ALL GOODS GUARANTEED. SEND FOR CATALOGUE AND PRICES.

RELIABLE AGENTS WANTED in all Unassigned Territory.

## U. S. WIND ENGINE & PUMP CO.

BATAVIA, ILLINOIS, U. S. A.

**BRANCH HOUSES:**—Kansas City, Mo.; Omaha, Neb. **DEPOTS:**—Fort Worth, Texas; Boston, Mass.

THE IMPROVED **ROSS** Ensilage and Fodder Cutters and Carriers.

FIVE NEW LINES OF CARRIERS ADAPTED TO ANY ANGLE OR PLACE.

New Style TREAD POWERS.
New 2, 4 and 6 Horse Sweep Powers.

LARGEST MANUFACTURERS OF SPECIAL ENSILAGE AND FODDER CUTTING MACHINERY IN THE WORLD.




Warranted stronger and more durable and of greater capacity with equal power than any other line of Cutters manufactured. Liberal inducements to agents. Send for large illustrated Catalogue, free, and six cents in stamps for new 160 page book, "Information on Ensilage and Building of Silos."

Address

THE E. W. ROSS CO.,

Manufacturers, SPRINGFIELD, OHIO, U. S. A.




# "The Burlington."

THE VESTIBULED LINE TO

## ALL POINTS NORTH, EAST, SOUTH AND WEST.

—THE—

## Chicago, Burlington & Northern Railroad,

AND CONNECTING LINES OF THE

## "GREAT BURLINGTON ROUTE,"

Offers to the traveling public the most expeditious and comfortable means of reaching

*Chicago, St. Paul, Minneapolis, St. Louis, Peoria, Kansas City, St. Joseph, Omaha, Lincoln, Denver and Cheyenne,*

From all the Principal Places in Wisconsin and Minnesota.

Its road bed is unexcelled, the grades are light, enabling fast time to be made, and the equipment is of the very best.

Starting from Minneapolis and St. Paul, its line runs along the east bank of the Mississippi to Savanna, Ills., whence one branch diverges east to Chicago, the other south to Fulton, Ills., connecting with the Chicago, Burlington, & Quincy R. R. Pullman sleeping cars to Chicago and St. Louis without change. Peerless dining cars on Limited trains, furnishing an unapproachable cuisine at moderate prices. For tickets, information, etc., apply to any railroad ticket agent, or address,

**GEO B. HARRIS,** *Vice President.* — *St. Paul, Minnesota.* — **W. J. C. KENYON,** *Gen. Pass. Agent.*




—THE—

# Short Line

Between

## CHICAGO (Via C., M. & St. P.)

AND

## MILWAUKEE

AND

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| Marquette, | Mich. | Negaunee, | Mich. |
| Ishpeming, | " | Houghton, | " |
| Hancock, | " | L'Anse, | " |
| Red Jacket | " | Calumet, | " |
| Republic, | " | Champion, | " |
| Iron Mountain, | " | Gladstone, | " |
| Menominee, | " | Sault Ste. Marie, | " |
| Green Bay, | Wis. | Ft. Howard, | Wis. |
| Marinette | " | Depere, | " |
| Menasha, | " | Neenah, | " |
| Appleton, | | Plymouth, | " |
| New London, | " | Grand Rapids, | " |

Pullman Palace Sleeping Cars on all Night Trains.

**C. F. DUTTON,** Gen'l Manager.

**W. B. SHEARDOWN,** Gen'l Tkt. Agt.

**MILWAUKEE**




# Minneapolis, St. Paul —AND— Sault St. Marie Railway.

**SERVICE UNRIVALED IN ALL RESPECTS.**

Direct Line with Through Trains Daily to

## NEW ENGLAND,
—BOSTON.—

## Atlantic Coast Points,
—NEW YORK.—

## CANADIAN PROVINCES,
—MONTREAL.—

## NEW BRUNSWICK,
—ST. JOHN.—

## NOVA SCOTIA,
—HALIFAX.—

Favorite Route for Summer Tourists. Through Sleepers and Dining Cars to the Atlantic.

F. D. UNDERWOOD, General Manager. | MINNEAPOLIS. | JNO. G. TAYLOR, Gen'l Pass. and Tkt. Agt.

W. S. THORN, Asst. Gen'l Pass. Agent, ST. PAUL, MINN.

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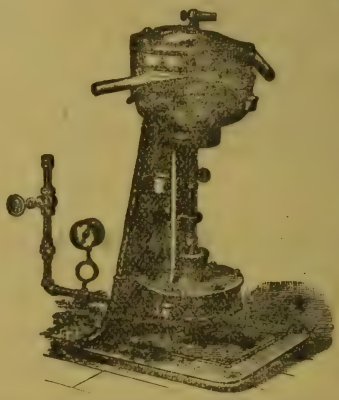
# D. H. ROE & CO.,

54--60 N. CLINTON ST., CHICAGO, ILL.

SOLE WESTERN AGENTS (Excepting Iowa), for

# De Laval Cream Separators

EASY TO CLEAN
AND
TO REPAIR.
THEY
NEVER BURST.
HAVE GOT
200 FIRST PRIZES.



CREAM DON'T FOAM
AND
YIELDS MORE BUTTER
THAN
ANY OTHER MACHINE.
CAUSE
NO PATENT SUIT.

**De Laval Turbine Separator.**

Also General Western Agents for

## CHR. HANSEN'S DANISH

## BUTTER COLOR,

## Cheese Color, Rennet Extract.

**Rennet Tablets, Sample by mail, 50 Cts.**

## UNIFORM, PURE AND STRONG,

Manufactnres and sells everything pertaining to the

**THE DAIRY, THE CREAMERY AND THE CHEESE FACTORY.**

Send for Illustrated Catalogue and Price List to

D. H. ROE & CO.,

*54--60 NORTH CLINTON STREET, CHICAGO.*

Our Machine says "YES" to each question. None other can.

**Globe Feed Cutters, Feed Mills and Powers.**




Write for Catalogue, Article on Ensilage and Prices.

1. Do the knives cut down?
2. Do they cut off clean?
2. Do they cut off uniform length?
4. Are the knives ground inside?
5. Will the rollers draw perfectly?
6. Are the knives made of solid steel?
7. Is the plate against which the knives cut of steel?
8. Is the fodder firmly pressed while being cut?
9. Will the rollers feed fine marsh hay perfectly, without winding?
10. Is the device for throwing the feed rollers out of gear the very simplest?
11. Are the knives the longest for width of cut, and have they the largest and easiest shear cut?
12. Does the automatic safety fly-wheel act with the pulley?

# Dr. Wm. Morrow & Son,

NASHVILLE, TENN.,

Breeders of Registered

# JERSEY CATTLE.

The following Cows are the Dams of our Service Bulls, and we think no other herd in the world can show such a list.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PRINCESS 2d 8046, | test for | 7 | days, | 46 | lbs., | 12½ | oz. | butter |
| ETHLEEL 2d 32291, | " | " | " | 30 | " | 15 | " | " |
| LANDSEER'S FANCY 2876, | " | " | " | 29 | " | ½ | " | " |
| FILLPAIL 2d 24388, | " | " | " | 26 | " | 2 | " | " |
| CHEROKEE ROSE 20921, | " | " | " | 23 | " | 10 | " | " |
| OONAN 2d 1485, | " | " | " | 22 | " | 2½ | " | " |
| ETHLEEL 18724, | " | " | " | 19 | " | 14 | " | " |
| SILVER ROSE 4753, | " | " | " | 16 | " | 14 | " | " |
| DIANA OF ST. L. 6636, | " | " | " | 16 | " | 8 | " | " |
| GERANIUM 3963, | " | " | " | 14 | " | 0 | " | " |

In the above list are the dams of sixteen tested cows, six of them over 20 lbs. We have sixty-five tested cows in the herd, two sons and twenty daughters of Tormentor 3533, and other good ones.

*ONLY YOUNG STOCK FOR SALE.*

# SALZER'S NORTHERN GROWN SEEDS




## THE GOVERNOR RUSK POTATO.

This grand potato, named in honor of the great Farmer Governor of Wisconsin, should be planted on ever farm in America. It is a potato that will sweep the country in yields, and take first prize on beauty and form of tubers and good quality everywhere. See my catalogue, it will tell you all about it.

## REMEMBER

That we grow and carry continually in stock the most complete line of Farm Seeds, as Wheat Oats, Barley, Corn, Rye, Potatoes, Grass and Clover Seeds, together with hundreds of varieties of Flower and vegetable seeds, which we sell at very low prices.

Pamphlet on grass culture free. Catalogue free. Write now.

**JNO. A. SALZER, La Crosse, Wis.**

# The Southern Cultivator

AND DIXIE FARMER.

**Established in 1843. Leading in 1890. 48th Year, 125,000 Readers.**

The most popular and reliable journal of its kind in the south. Endorsed by the press and people as a journal for the farm, fireside and counting-room. It goes to every part of the south and south-west. It is a first-class advertising medium. The recognized organ of southern agriculture and the industrial progress of the south. Farmers, Lawyers and business men read it.

**SINGLE SUBSCRIPTION, $1.00.**

THE CULTIVATOR PUBLISHING CO., Proprietors,
Drawer M, Atlanta, Georgia.

☞Address all communications as above.

☞ *Mention "Farmers' Institute Bulletin" when writing to Advertisers.*




Factory: APPLETON, WIS.

Branch: MINNEAPOLIS, MINN.

# GRASS SEEDS

TIMOTHY, CLOVERS, FLAX, HUNGARIAN, MILLETS, RED TOP, BLUE GRASS, LAWN GRASS, ORCHARD GRASS, BIRD SEEDS, ETC.

# POP CORN

We make a specialty of all kinds in large or small quantities.

# ENSILAGE CORN

ALL STANDARD VARIETIES, in car load lots or less.

OUR SPECIALLY SELECTED MAMMOTH SOUTHERN SWEET or FODDER CORN has proven itself fully equal the best known. Also, SHEEPS'-TOOTH and RED FODDER.

**PLEASE CORRESPOND BEFORE BUYING.**

# FLAX SEED.

Being dealers, we do not handle on commission, but buy and sell for our own account. Any one having Seed to dispose of is requested to send fair average sample, stating quantity, and we will endeavor to make a satisfactory trade.

REFERENCES: First National Bank, Mercantile Agencies and Merchants generally.

# THE ALBERT DICKINSON CO.,

SEED MERCHANTS,

WAREHOUSES:
115, 117 & 119 Kinzie St.
104, 106, 108 & 110 Michigan St.
198, 200, 202 & 204 Market St.

OFFICES, 115 KINZIE ST.,

CHICAGO, ILL.




# MILWAUKEE, LAKE SHORE & WESTERN RY.

## Through Palace Sleeping

—AND—

## Parlor Car Line,

—BETWEEN—

## CHICAGO AND MILWAUKEE,

—AND—

## APPLETON, WAUSAU AND ASHLAND.

The Gogebic, Penokee and Montreal Iron and Mineral Ranges, *Hurley, Ironwood, Bessemer and Wakefield*, and the manufacturing centers and lumbering districts of Central and Northern Wisconsin.

### Sheboygan, Manitowoc, Kaukauna, Appleton, Wausau and Rhinelander.

Special Inducements and Facilities offered for the location of Manufacturing Establishments.

### TO SPORTSMEN.

The most celebrated Fishing Resorts for Bass and Muskallonge in the Northwest are all reached by this Line—

GOGEBIC LAKE, TOMAHAWK LAKE REGION, TWIN LAKES, LAKE VIEUX DESERT THE EAGLE WATERS, PELICAN LAKE, THE ONTONAGON, BRULE AND OTHER TROUT STREAMS.

Guide Books, Maps, Time Cards, and full information furnished on application to any representative of the Passenger Department.

CHAS. L. RYDER, Gen'l Agt. A. W. RUSSELL, City Pass. & Tkt. Agt.
197 Clark Street, Chicago.

Milwaukee City Office, 95 Wisconsin St.

H. F. WITCOMB, Gen'l Manager,

F. P. REGAN, Chief Clerk Gen'l Pass. Dept.

MILWAUKEE, WIS.

# T. L. KELLY & CO.,

89 & 91 Wisconsin St., and 385 Broadway, Milwaukee.

# DRY GOODS.

**The greatest variety** of useful goods, the best arranged departments, and

## The Lowest Prices in the State.

**Dress** Goods, Silks, Velvets, Cloaks, Shawls, Flannels, Blankets, Merino and **All** Wool Underwear, Ladies and Children's Muslin Underwear, Hosiery, Gloves, Corsets, Laces, Ribbons, Trimmings, Dress Buttons, Handkerchiefs, **Prints**, Ginghams, Gents' Furnishing Goods, House Furnishing Goods, Etc., Etc., Etc.

## SAMPLES SENT ON APPLICATION.

Goods ordered and left to our judgment to select, may be returned by express at **our expense** if not satisfactory, if returned immediately and in good order, and other **goods will be sent** in exchange or the money refunded, as the customer may desire.

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**Every** Lady Visiting our Store Should go through and Examine our

## House Furnishing Department.

She will there find hundreds of useful things for the

## KITCHEN AND DINING-ROOM,

That she had never thought of, or had neglected to purchase, and which she will not be with out when she sees them and realizes their usefulness and ascertains the Low Prices at which we are selling them.

**A VISIT TO OUR ESTABLISHMENT WILL BE INTERESTING AND PROFITABLE TO YOU.**

## T. L. KELLY & CO.

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*Mention "Farmers' Institute Bulletin," when writing to Advertisers.*

# A Great Railway.

The Chicago, Milwaukee & St. Paul Railway Company now owns and operates fifty-six hundred and seventy-five miles of thoroughly equipped road in Illinois, Wisconsin, Minnesota, Iowa, Missouri, South and North Dakota. Each recurring year its lines are extended in all directions to meet the necessities of the rapidly populating sections of country west, northwest and southwest of Chicago, and to furnish a market for the products of the greatest agricultural and stock raising districts of the world. In Illinois it operates 316 miles of track, in Wisconsin 1,309 miles; in Iowa 1,572 miles; in Minnesota 1,122 miles; in Dakota 1,216 miles; in Missouri 140 miles, and the end is not yet. It has terminals in such large cities as Chicago, Milwaukee, La Crosse, St. Paul, Minneapolis, Fargo, Sioux City, Council Bluffs, Omaha and Kansas City and St. Joseph, Mo., and along its lines are hundreds of large and small thriving cities, towns and villages. Manufacturing interests are cultivated, and all branches of trade find encouragement. The Railway Company has a just appreciation of the value of its patrons, and its magnificent earnings are the result of the good business tact which characterizes the management of its affairs.

The popularity of the line is attested by the fact that notwithstanding the strongest kind of competition of old and new lines, the Chicago, Milwaukee & St. Paul Railway continues to carry the greater portion of all the business between Chicago, Milwaukee, St. Paul and Minneapolis. It is the best patronized route between Chicago, Council Bluffs and Omaha and to and from all points in Wisconsin, Minnesota, Dakota and Iowa, and its Kansas City and St. Joseph line will undoubtedly take equal rank with the older lines leading to and from the Southwest.

On all its through lines of travel the Chicago, Milwaukee & St. Paul Railway runs the most perfectly equipped trains of Sleeping, Parlor and Dining Cars and Coaches. The through trains on all its lines are systematically heated by steam. No effort is spared to furnish the best accommodations for the least money, and, in addition, patrons of the road are sure of courteous treatment from its employes.




# Free Catalogue

— OF —

HOME GROWN



# Northern Seeds, Plants, Bulbs, etc.

**ALL FROM NEW CROP--TESTED AND PURE.**

**NO OLD BOX SEEDS.**

**My Prices in Packets from 2 to 5 cents. In quantity as low as any Responsible House in America.**



*Crookston, Minn., April 22, 1890.*
Your flower seeds were the best we ever used. JAS. A. BEMIS.

*Madison, Wis.*
Had radishes in 23 days from planting.
C. N. BROWN,
Attorney-at-Law.

*Madison, Wis.*
Your Cauliflower seed the best I ever used.
H. TAYLOR.

*Curtis, Nebraska.*
Seeds came all right, are planted and doing finely. C. MOFFAT.

*Cambridge, Wis., Apr. 2, 1890.*
Enclosed please find $3.05 for watermelon seed. Those I bought of you last year were perfect. Not one failed to grow; from $1.00 worth of seed sold $50.00 worth of melons, and gave away as many more.
STACY J. POTTER.

## A. R. AMES, Madison, Wis.

# THE PRAIRIE FARMER IS THE BEST

Read the opinions from a few of its readers. Space will not allow us to publish thousands of others.

**INDEPENDENT, NON-PARTISAN, FEARLESS and ALERT.**

The Untiring Advocate of all the rights of Agricultural Communities; an Exponent of Agriculture in the United States.

**ESTABLISHED IN 1841.**




## THE FARM, ORCHARD AND FIRESIDE.

Published by THE PRAIRIE FARMER PUB. CO 150 Monroe St., Chicago.

SUBSCRIPTION, $1 00 A YEAR. - - - ISSUED EVERY WEEK.

## PUBLISHED IN THE INTEREST OF PRACTICAL AGRICULTURE.

**EVERY DEPARTMENT HAS ITS SPECIAL EDITOR,**

——Devoted to——

**AGRICULTURE, LIVE STOCK, DAIRY, HORTICULTURE, ENTOMOLOGY, VETERINARY, GARDEN AND LAWN, THE FARMER'S CLUB.**

——And Welcome in the Home for its ——

**HOUSEHOLD, POULTRY, APIARY, WEEK'S NEWS, YOUNG FOLKS, PUZZLES, MISCELLANY, ETC.**

Original Engravings in every issue give additional interest to the well written Articles.

## THE OLDEST AND BEST AGRICULTURAL PAPER IN THE WEST.

### WHAT OUR PATRONS SAY:

The familiar face of THE PRAIRIE FARMER has become one of the family, having visited us continually for the last 20 years. J. A. PLATT, Clay Co., Iowa.

We highly appreciate THE PRAIRIE FARMER, and think it is a paper that should find its way into every farm-house. G. B. MUNGER, Livingston Co., Ill.

I am highly pleased with THE PRAIRIE FARMER, and consider it the best paper of the kind that I have ever seen. R. H. BAKER, Pike Co., Ill.

I am well pleased with THE PRAIRIE FARMER. It is the best paper I have ever read. C. S. GOULD, Jasper Co., Iowa.

Have taken THE PRAIRIE FARMER 30 years, and it seems to grow better and better. D. J. PARKER, Whiteside Co., Ill.

I have taken THE PRAIRIE FARMER every year since January 1, 1849, and I must say that under its present management it is better than ever before. NICHOLAS MILLER, Scott Co., Iowa.

THE PRAIRIE FARMER itself is perfect, and the king of farmers' papers. WM. A. JEFFERSON, Boone Co., Ia.

THE PRAIRIE FARMER is just what every farmer should subscribe for; it is interesting for everybody, old and young. R. S. HARTER, Kane Co., Ill.

I have read many farm papers, and the general make-up of THE PRAIRIE FARMER suits me the best of any I have read. ALEXANDER DAVIS, Madison Co., Ind.

I like THE PRAIRIE FARMER well. It is a thoroughly practical farm paper, chuck full of useful information. I. A. PATRICK, Clay Co., Ill.

I consider THE PRAIRIE FARMER a model paper, well suited to the mass of farmers. A. W. REEVES, Cook Co., Ill.

THE PRAIRIE FARMER is a good paper and keeps up with the times. After looking for a paper for my family, among all others selected it as the best. H. C. LUDINGTON, Warren Co., Iowa.

Farmers are being waked up to the real situation of affairs by such articles as appear in THE PRAIRIE FARMER and are uniting for business. Keep on in your good work. S. P. FLEMING, Cass Co., Mo.

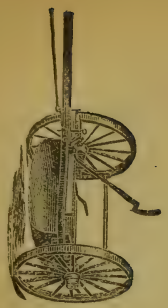
Success to THE PRAIRIE FARMER. Your paper is a good one. No farm brought to be without a copy of same. MR O'DONELSON, Seward Co., Nebr.

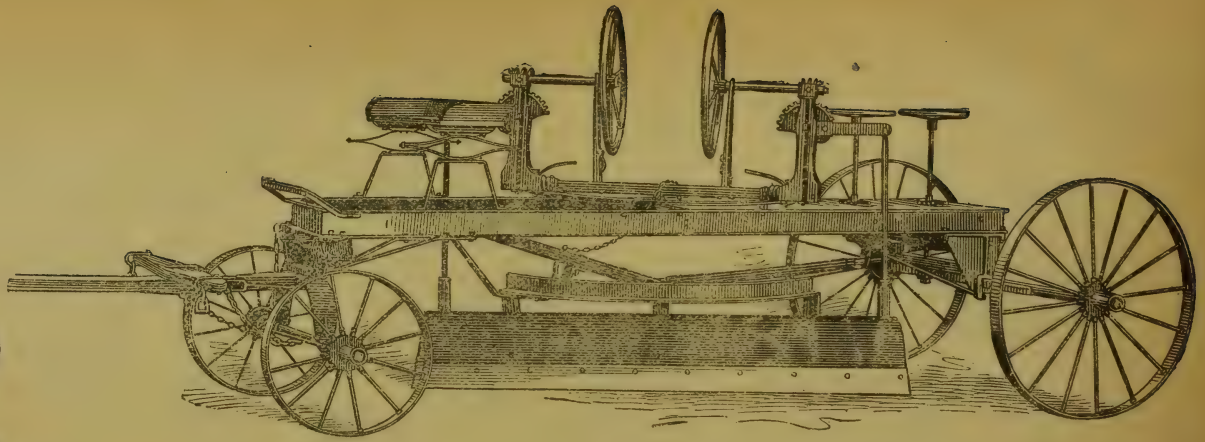
Your tone on the great economic questions of the day are so pat to the mark that I must hold on to THE PRAIRIE FARMER. J. F. S. SMITH, Antelope Co., Nebr.

Last year I carried an ad in your paper and also in three poultry journals; but as your rates seemed high, I concluded to advertise only in the poultry papers this year. Accordingly I made our contracts with five of those journals the first of the year. But I have concluded that my little ad. in THE PRAIRIE FARMER paid me best in the end, as I am still getting an occasional order from that source. H. L. BALLARD, McLean Co., Ill.

Send for Specimen Copies and Terms, Rates of Advertising, etc., to

**THE PRAIRIE FARMER PUB. CO., Chicago, Ill.**







# American Road Machine Co.,

## of Kennett Square, Pa.,

Manufacture a full line of Road Making Machinery, including seven different sizes and styles of Road Machines, ranging in Price from one hundred to two hundred sixty-five dollars. All Thoroughly Warranted.

*Send for Catalogue.*

C. W. POTTER, State Agent, Mauston, Wis.

☞General Office and Transfer House, Madison, Wis.



THE

# Green Bay, Winona & St. Paul R. R.

—IS THE—

## SHORTEST ROUTE

—FROM—

# GREEN BAY

And all points in **EASTERN WISCONSIN** to

NEW LONDON, MERRILL, STILLWATER,
STEVENS POINT, WINONA, HUDSON,
GRAND RAPIDS, LA CROSSE, EAU CLAIRE,
WAUSAU, CHIPPEWA FALLS,

## St. Paul, Minneapolis, Sioux City, Omaha
## AND COUNCIL BLUFFS,

And all points in Minnesota, Dakota, and all points on the NORTHERN PACIFIC RAILROAD and ST. PAUL, MINNEAPOLIS & MANITOBA RAILROAD; is the

# SHORT LINE

From WINONA, LA CROSSE, and all points on the CHICAGO, BURLINGTON & NORTHERN RAILROAD, WINONA & ST. PETER RAILROAD and SOUTHERN MINNESOTA RAILROAD, to

MERRILLAN, STEVENS POINT, FOND DU LAC,
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GRAND RAPIDS, OSHKOSH, GREEN BAY,

—AND ALL POINTS IN—

**Eastern Wisconsin, Northern Michigan and Lake Superior Regions.**

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The **DIRECT LINE** to all the above points.

THE PASSENGER EQUIPMENT of this Road embraces all the modern improvements and conveniences that tend to make traveling by rail safe and comfortable.

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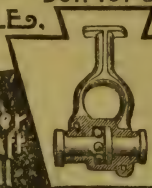
WHAT WILL THEY DO? PUT IN GRAIN AND MANURE ON CORN STALKS, STUBBLE, FALL OR SPRING PLOWING.

Often Save Plowing... Always pulverize the Soil for any crop.





This Hanger lightens Draft and will not wear out. Used only on the KEYSTONE DISC HARROW.



Cover Grain and Manure to the PROPER DEPTH. Saves time and seed. Increases Yield.

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YET FEWER PARTS THAN ANY OTHER PLANTER.

ONE HORSE DRILL. FOR CORN BEANS, PEAS, SORGHUM ETC.



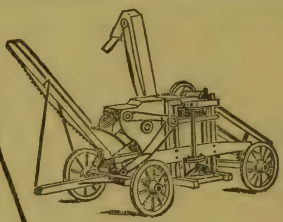
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4 & 6 HOLE POWER SHELLER.

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# "KEYSTONE"
# Corn Husker and Fodder Cutter
## COMBINED.



*IT IS A SUCCESS. SEND FOR ILLUSTRATED CATALOGUE.*

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### A VOICE FROM KANSAS ABOUT THE HUSKER.

C. C. Gardiner, of "Bright Side Stock Farm," Bradford, Kansas, writes us June 19, 1890, in reference to the Corn Husker:

"I had some trouble in adjusting the Corn Husker to my two horse tread power, but after experimenting some, Presto! Eureka! we got there hands and feet! The horses traveled nearly natural, but still a little slow, but it gave all the motion to the Husker that was necessary. When the fodder was dry we could run it through as fast as it could be put upon the platform.

"The corn went 60 bushels to the acre and the fodder was large. It had to be fed on the jump to keep the Corn Husker up to its capacity. It took one man to load on table as fast as the Corn Husker would take it. We could not have husked more if we had had an engine. It worked us hard and we were obliged to reduce the speed. We fed one large load through in 30 minutes, and we were obliged to rest 20 minutes before starting again, we were so exhausted.

"I was using two 1200 lb. horses, and we have husked 150 bushels in 4½ hours. By using a tread power instead of an engine or sweep power, we saved one man's wages and the fuel for an engine. I raise from 150 to 200 acres, and it has been an unsolved problem with me for a good many years how to handle the fodder crop, but it is now solved by using the Keystone Corn Husker and Fodder Cutter. I make it a practice to utilize the "by" products of the farm, such as straw and fodder, and to which I attribute my success in farming."

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**Superb Train Service,**
**Good Connections,**
**Fast Time and No Delays**

Can all be secured by taking the

# Northern Pacific R. R.

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**British Columbia,**
**Oregon and California.**

THIS IS THE

## Yellowstone Park & Dining Car Route.

The NORTHERN PACIFIC RAILROAD is the SHORT LINE to HELENA, TACOMA, SEATTLE, and PORTLAND, ORE.; is the ONLY LINE running PULLMAN SLEEPING CARS to FERGUS FALLS, GRAND FORKS, GRAFTON, WINNIPEG, FARGO, HELENA and BUTTE CITY, and is the ONLY LINE reaching JAMESTOWN, BISMARCK, MILES CITY, BILLINGS, BOZEMAN, MISSOULA, SPOKANE FALLS, TACOMA and SEATTLE.

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AND

## FREE COLONIST SLEEPERS

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**This Line Offers Special Attractions to California Tourists.**

For full information concerning rates, time, etc., call on or address your nearest ticket agent, any traveling passenger agent of this company, or

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Containing Alliance news from all parts of the United States, and weekly discussions of Alliance principles, will be

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At the end of four weeks it will be discontinued without notice, unless subscribed for in due form at the rate of $1.00 per year, invariably in advance.

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is a twenty-four page weekly, devoted to the advancement of the agricultural interests, and claims to be the cheapest agricultural paper in the western states. Whether this claim is well founded or not can be ascertained by any farmer at the expense of one cent, by sending his name and address on a postal card to the

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**IF YOU** *Want a Good Business Education.*
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*Wish to Obtain a Practical Education.*

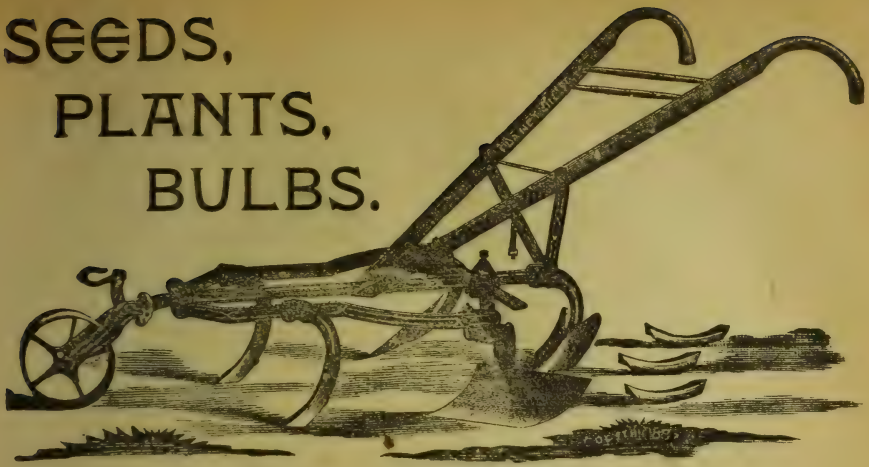
The Commercial and Short-hand Departments are open during the **entire year,** and Students can enter at any time.

The Fall Term of the Academy Commences September 1, 1890.

☞ Catalogue containing full information sent to any address free.

DEMING and PROCTOR, Principals,
MADISON, WISCONSIN.

# SEEDS, PLANTS, BULBS.



Wholesale and Retail Dealers in

## AGRICULTURAL & GARDEN IMPLEMENTS.



"CREAM CITY."

**Introducers of this famous** Potato; conceded by all growers **as the best early Potato now in** the market. **It is** a large yielder, cooks quick and dry very much like the **old Snowflake.** The flesh **is** pure white. As a keeper it is unsurpassed, showing no disposition to sprout until late in spring.

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Illustrated Catalogue furnished free on application.

## Over 400 Prizes in Three Years.



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# Oxford Down, Shropshire,

AND

# SOUTHDOWN SHEEP.

## Cheshire Hogs and Bronze Turkeys

Of Extra Quality, Bred and Imported by

**GEO. McKERROW,** *Sussex, Waukesha Co., Wis.*

Velvet Chaff and Turkish Red Winter Wheat.

OUR MOTTO: "THE BEST IS NONE TOO GOOD."

**R. R. STATIONS**—Templeton, on Wisconsin Central, and Pewaukee, on Chicago, Milwaukee & St. Paul.

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TIME LESS THAN
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VIA NEW ORLEANS
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PULLMAN BUFFET SLEEPERS
ON NIGHT TRAINS.

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The four Danish Dairymaids fro ı Copenhagen Working Dairy.

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## RENNET EXTRACT,

CHEESE COLOR,

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Rennet Tablets by mail, 50 Cts.

Over 100 First Prize Medals.

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## Extra Good Victoria Swine and Jersey Cattle.




First-class Pigs shipped and satisfaction guaranteed. Visit my herd and make your own selection. All stock recorded. Correspondence solicited.

**GUSTAV SCHROETER,**
Grafton, Ozaukee Co., Wis.

# MORGAN'S LINENS.



RECOGNIZING the fact that it is a somewhat difficult thing for our out of-town customers to make selections of LINENS with out seeing the goods, we submit to their notice a few which are specially desirable. Send a sample order, and if the articles be not entirely satisfactory you can return them at our expense. A complete price list of Linens and White Goods will be found in our "Summer Supplement," which you can have free by mail on application.

## TABLE DAMASK.

Our 62 inch wide yard bleached cream Table Damask, extra heavy, at only **50c** a yard, is a decided bargain. Large and varied assortment of patterns in square and floral designs.

Our 63 inch wide and 66 inch wide extra fine bleached Table Damask, at only **75c** and **85c** a yard, respectively, cannot be surpassed. New and elegant patterns, comprising large and small polka dots, checks and floral and running vine designs.

Our **$1.00** a yard heavy bleached Double Damask is splendid value, and a quality of which our sales are very large. The patterns of these goods are some choice novelties, in fruit. floral, leaf and geometrical designs, and are confined to our own trade.

*** We have 20x20 and 24x24 Napkins to match most of the designs of the above damask.***

## TABLE NAPKINS.

Our 19x19 bleached Table Napkins at **$1.50** a dozen and 20x20 bleached double Damask Napkins at **$1.75** and **$2 00** a dozen are very cheap. These goods improve with the washing.

Our 23x13 double bleached damask Napkins at **$2.00** a dozen and our 23x23 double damask Napkins at **$2 50** a dozen are splendid values.

Our 24x24 bleached double damask Napkins at **$3.00, $3.50** and **4.00** a dozen are both choice and cheap.

## TOWELS.

Our 18x36 all-linen Huck and Damask Towels at **12 1-2c** each are extremely popular.

22x45 all linen Huck and Crepe Towles at **20c** each are much below regular prices.

Our **25c** line of Towels comprises Huck, Damask, Crepe, Basket Weave, etc. This line is the best that can be had at the price.

We pay freight or express on all Linens sent to points in Wisconsin.

**JAMES MORGAN,**

**386, 388 AND 390 E. WATER ST., MILWAUKEE, WIS.**

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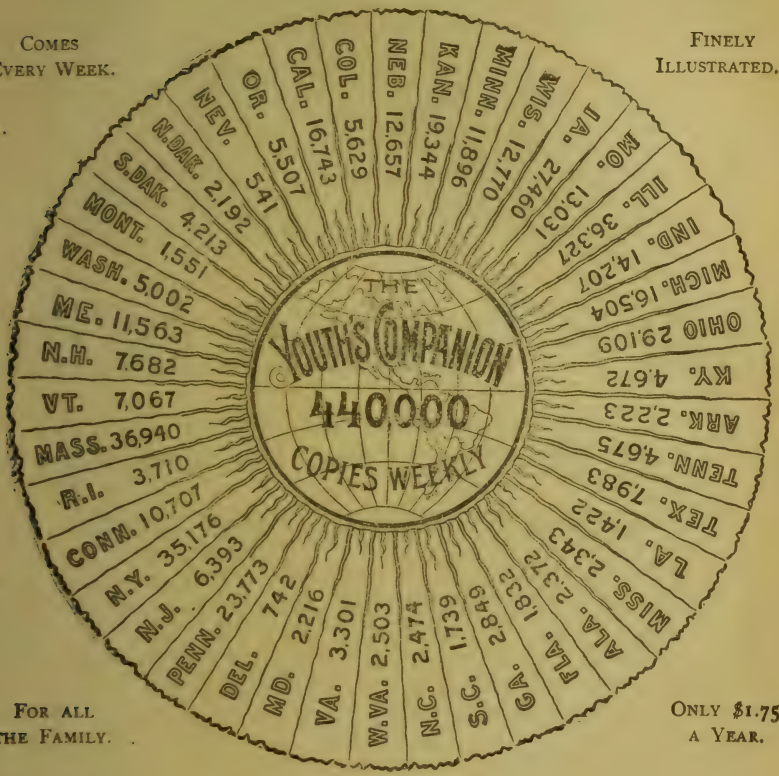
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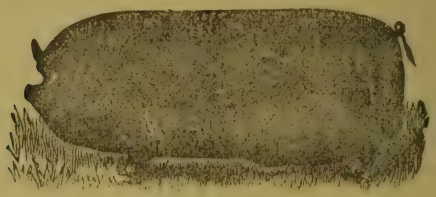
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# 200 BERKSHIRE SWINE 200

## W. H. JACOBS, Madison, Wisconsin,

**Importer and Breeder of the Large, Improved**



# English Berkshire Swine.

I have now over Two Hundred head of Swine, every one either Registered or Eligible for Registration. I have at the head of my herd

## IMPORTED PRINCE REGENT.

Have a large number of young Boars ready for service now. None but the best kept for breeding purposes. I use the knife freely. I have shipped to many different states this year. Have special rates by different express companies. All stock delivered at express office free of extra charge. I guarantee all stock sold by me breeders, and always sell at lowest prices possible. I breed Berkshire because they are an active hog, better calculated to follow cattle than any other breed. Commission men in Chicago say that they are worth more per cwt. than any other hog. Easily moved from one pen to another. Less cripples and dead ones in a car than any other breed. Packers as well as experience tell us that they have a larger per cent. of lean meat than any of the other pure breeds; and they are always ready for market if properly fed.

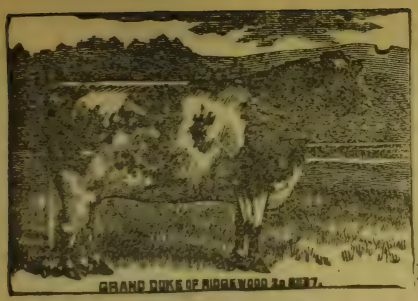
For prices and particulars address

W. H. JACOBS,

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Or, call on P. WAKEM, Manager of the Farm, Burke Station, five miles from Madison on the C., M. & St. Paul R. R.

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# 175 Short Horns.

WM. H. JACOBS,

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# SHORT HORN CATTLE.

My herd consists of such families as Barringtons, Princess, Kirklevington, Fennell Duchess, Roan Duchess, Mazurkas, Adelizas and a number of other very useful families. Headed by the imported bull Welcome Guest 101271, bred in England, assisted by the Booth bull, British Ensign 96490, and the two Bates bulls, Lord Kirklevington, of Erie, 1399193 and Marquis of Kirklevington 99395.

My ambition is to breed low down, blocky animals as well as great milk producers. My herd won forty-four prizes last year at Iowa State, Minnesota State, Wisconsin State and Dane County fairs. Included in this number are nine sweepstake prizes; four of them being for herds bred and owned by exhibitor. I have won sweepstakes on bulls and grand sweepstakes on herds at State Fair for last three years. All females exhibited by me last year were of my own breeding. I have always at my farm a large number of young bulls to select from, as well as cows in calf, for sale at all times at reasonable prices. We make a specialty of always keeping a number of young animals in show yard condition, so anyone desiring show animals can always find them here. Parties wishing to purchase either single animals or in car load lots will always find a large assortment to choose from, and at prices where you will always receive good value for your money. Send for catalogue. Address

W. H. JACOBS,
Madison, Wis.

Or, call on P. WAKEM, Manager at Farm, Burke Station, five miles east of Madison on the C., M. & St. Paul R. R.

Ample time given responsible parties.



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First-Class Plants

At Reasonable Prices.

ALL THE LEADING VARIETIES OF

# STRAWBERRIES,

# Red and Black Raspberries,

## BLACKBERRIES, CURRANTS,

# GOOSEBERRIES AND GRAPES.

ALSO

# Fruit and Ornamental Trees.

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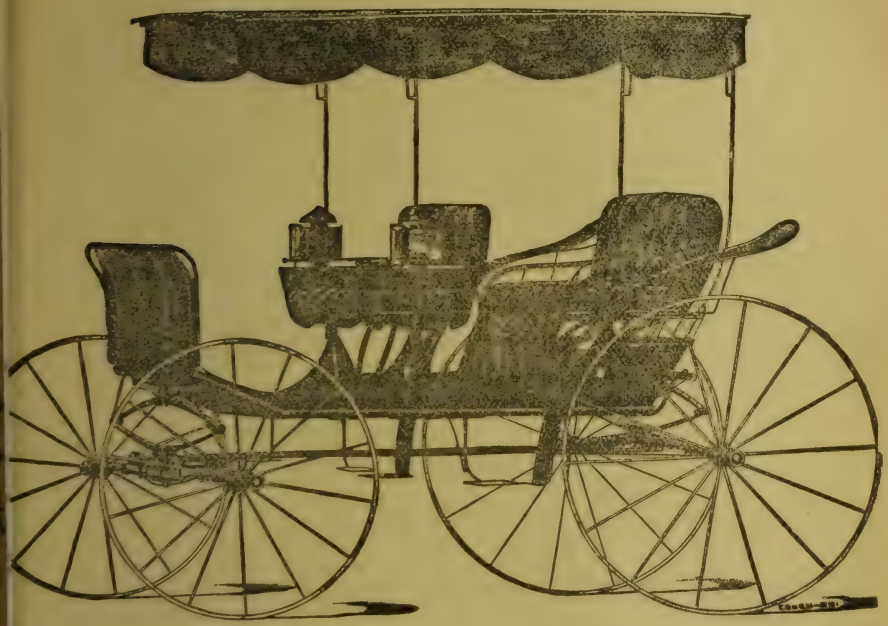
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## J. M. Edwards & Son,

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For Less Money Than Ever Before.



## Largest Factory IN THE State.

Great Variety, Elegant Styles.
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RURAL HOME CO., LIMITED,
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## The Best of the Best Class of Advertising Mediums.

# "THE MAPLES"

# Herd of Jersey Cattle.



IDA OF ST. LAMBERT, 24990. Property of Miller & Sibley, Franklin, Pa.
Mr. Fuller says she is the greatest milk and butter giving Jersey combined in the world. Her blood is strongly represented in "The Maples" herd.

# The Profit is in the Dairy.

## THE BEEF BUSINESS IS DISCOURAGING.

## The "General Purpose" Cow is a Delusion

"The Maples" farm, the home of "The Maples Herd of Jersey Cattle," is situated at the eastern city limits of Madison, Wisconsin. It is easily accessible from the city, as any street car going east will take you within a few moments' walk. We would be glad to have you come out, whether you wish to purchase or not: you will feel repaid if you enjoy looking at fine Jersey cattle. The choicest strains of Jersey blood are represented in this herd, and the cattle have individual merit.

We trust your visit will be something pleasant to remember; it may result in your thinking of our herd should you ever want anything in Jerseys.

Very truly yours,

Madison, Wis., 1890. **C. B. MILLER & CO.**

1856. THE 1890.

# S. L. SHELDON CO.,

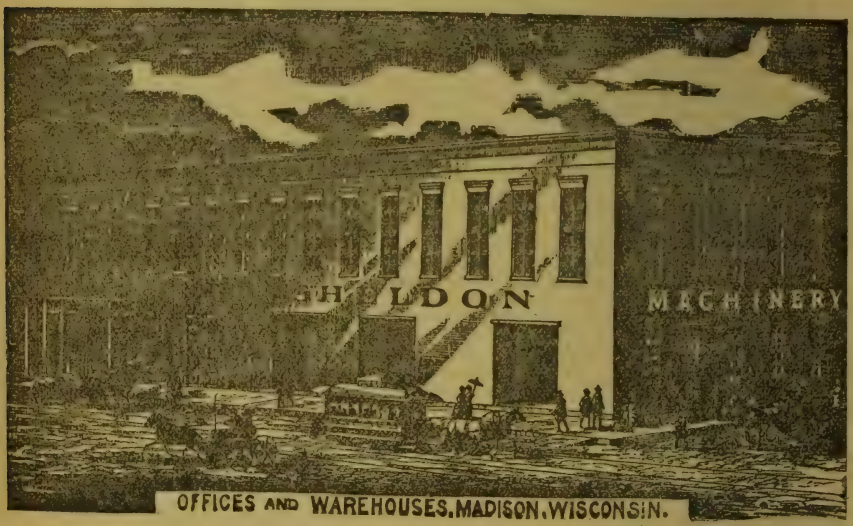
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# Standard Farm Machinery

IN THE NORTHWEST.

## A SPECIALTY OF EVERY DEPARTMENT.




Lawn Mowers, Garden Seed Drills and Hand Cultivators. Plows and Soil preparing Tools of every kind. Drills, Seeders and Planters. Double and Single Row Drills for Ensilage Corn Planting. Cultivators for Field, Garden and Tobacco Culture. Latest Improved and Best Harvesting Machinery. Large variety of Feed Mills, Hay Fodder and Ensilage Cutters, also Tread and Lever Horse Powers or Engines to operate them.

**WE MAKE A SPECIALTY OF FEED PREPARING MACHINERY.**

Write for catalogue and copy of "Facts for Farmers,"

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*Farm Trucks, Carts, Road Machines and Road Scrapers.*

WELL DRILLING AND STUMP PULLING MACHINERY, DITCHING MACHINES AND TILE MAKING MACHINERY.

**Come and see us, write for Catalogue, Circulars and prices for anything in our line.**

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## NURSERYMEN

—— AND ——

# Fruit Growers

**FORT ATKINSON, WIS.**

**Small Fruit Plants, Grape Vines, Fruit Trees, Ornamental Trees and Shrubs, Flowering Vines and Bulbs, Seeds and Seed Potatoes.**

*FRESH FRUITS IN THEIR SEASON.*

EVERY family that occupies a piece of land, whether a two rod garden or a thousand acre farm should grow fruit. We mention a few of the leading varieties that are easily grown, hardy, productive and every way good and reliable:

**STRAWBERRIES**—Jessie, Bubach, Warfield, Haveland, Wilson, Crescent and Park Beauty.

**BLACK RASPBERRIES**—Tyler, Souhegan, Ohio, Nemha and Gregg.

**RED RASPBERRIES**—Turner, Brandywine and Cuthbert. Shaffer's Colossol: —A Red Raspberry that does not sucker but grows like a Black Cap.

Improved Dwarf Juneberry.

**BLACKBERRIES**—Stone's Hardy, Snyder and Ancient Britton.

**GOOSEBERRIES**—Houghton, Downing and Industry.



**CURRANTS**—Red, White and Black.

**GRAPES**—Moore's Early, Worden, Brighton, Niagara and Concord.

We also have Fruit and Ornamental Trees, Roses, Flowering Shrubs and Vines, Bulbs, Etc.

Progressive Farmers find it pays to change their Seed Potatoes frequently. We are making a specialty of growing choice varieties for seed.

Send for one of our Catalogues which tells all about the varieties of Plants, Trees, Shrubs, Etc., that we have to sell and gives prices on them. We will be glad to send it to you free, and should like to correspond with you if you find anything in it you want. We want a good local agent in every county. Write us for terms, etc.

**COE & CONVERSE,**

*FORT ATKINSON, WIS.*

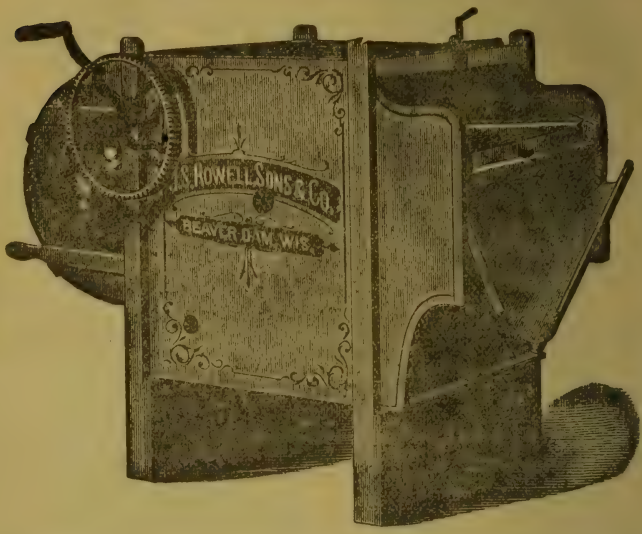


THE FARMER'S FAVORITE,

# The Improved Angle Sieve Fanning Mill

**The ONE and ONLY True Principle for Separating Oats from Wheat or Barley.**

*The most successful Separating Device ever invented.*




*Satisfaction guaranteed always. Send for Circulars and Prices.*

**By recent Improvements** made in constructing the **Angle Sieves** and changing the motion of the Shoe, the separating capacity has been increased

ONE HALF.

**We can** now offer Farmers a Mill that is **Unsurpassed** or **Unequaled** as Separator and Cleaner of every description of Grain and Seeds.

*THIS IS NO HUMBUG! ONE THOROUGH TRIAL ALWAYS CONVINCES!*

**Special inducements offered Dealers and Farmers.**
**Agents Wanted Everywhere.**

**Address all orders and inquiries to**

## The J. S. Rowell Mfg. Co.,

*Sole Manufacturers of the Improved Angle Sieve Mill,*

BEAVER DAM, WIS.

**Also manufacturers of the largest variety of Seeding and Cultivating Machines of any concern in the Northwest. The "Tiger" Broadcast Seeders, Hoe Drills, Shoe Drills, Spring Tooth Field and Corn Cultivators Combined. Hay Rakes and the "Tiger" Separators and Powers.**

*Send for Illustrated Pamphlets.*

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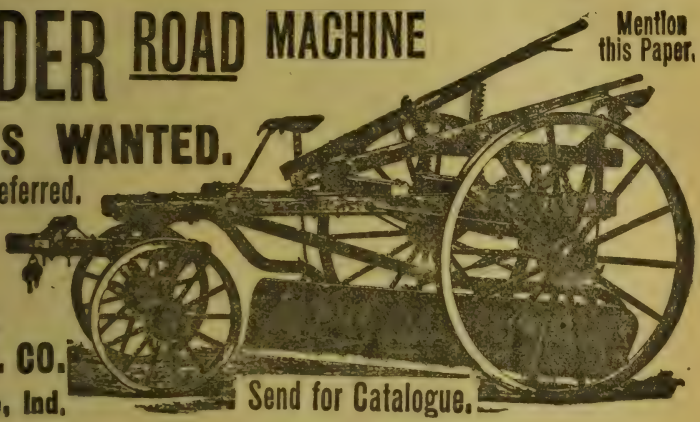
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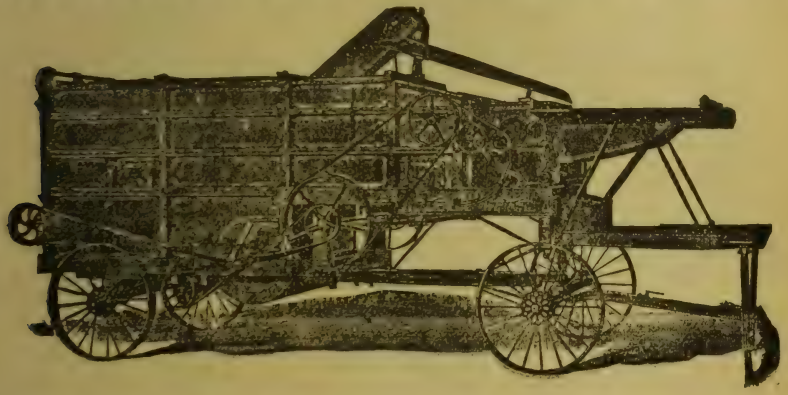
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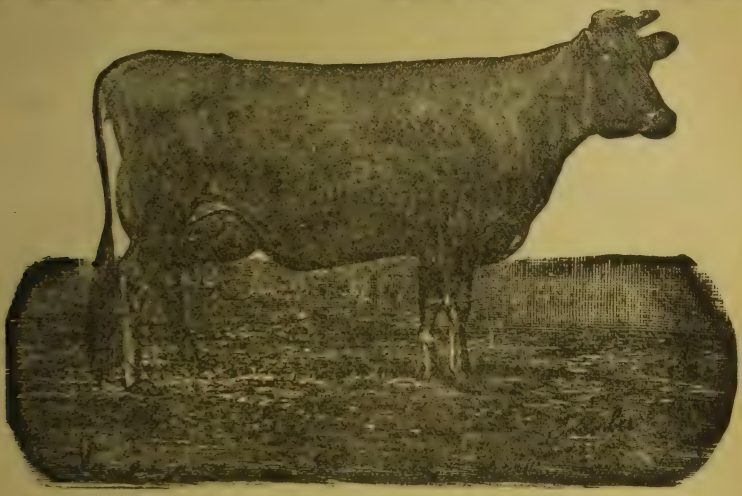
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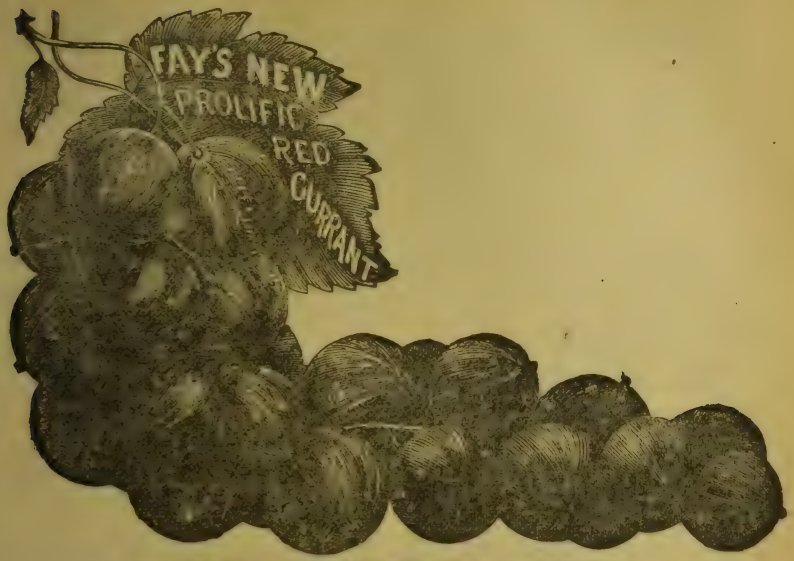
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*Dear Sirs:*—I have used your weeder now two seasons. One would think such a light harrow would do little good such a season as this, but it has been very valuable to me. After our potatoes were planted it rained heavily and quite constantly for nearly a month. This packed the ground very hard, so hard the weeder could hardly touch it. As soon as we could see the rows we cultivated the field and followed with the weeder, which hoed the strips along the rows left by the cultivator, nicely stirring every bit of soil. There was one outside row, too rough to use the weeder on (plowed nearer the fence than usual), which my man hoed by hand. While he was hoeing that row my son hoed with the weeder and one horse, more thoroughly, 36 rows. We had harrowed the piece between showers so there were no weeds. We had a shower last night and my son is running the weeder over more than an acre an hour to-day, doing the hoeing and cultivating both, as deep as we want it done now. I am sorry we have not another weeder so we could get over all the ground while it is just right to crumble nicely. Must have two next year. I have not used the weeder on corn except on sweet corn in the garden. It worked all right there. T. B. TERRY.

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WALDO F. BROWN.

UNIVERSAL WEEDER CO., No. Weare, N. H.

*Dear Sirs:*—Your favor of the 9th received. We did not use the weeder immediately after the planting, as the season was very late and we were obliged to put on both harrows and continue harrowing until the corn was up. The working capacity of the weeder being only 6 ft. 6, would not cover as much ground as the harrow. We think the weeder should be made considerably longer in order to do the same amount of work that the harrow will. After harrowing the ground thoroughly rains came and delayed the work for a week, corn was now 8 inches high, too high for the harrow, and the ground had become very compact and the weeds had got quite a start. My men looked with a sort of contempt on the weeder, and I let them go to work with their cultivators while I personally took the weeder, my object being to see how clean I could make hill culture in a separate field. The corn being about 8 inches in height, and also about one acre of potatoes which had been cultivated between the rows, but were very weedy in the hills. Indeed I was astonished at the result. The loose soil between the rows enabled the weeder to take hold in the hills and rooted out the weeds and exposed them to the sun with little harm to the corn or potatoes. If used rightly and intelligently in a field that has received proper cultivation, with favorable weather, it has no equal in weeding all hoed crops. I do not think anything can beat it in potato culture. I went into my garden where potatoes were 12 inches high and it did the tops no harm while it eradicates all the weeds. I have no hesitation in recommending it for general use. My only objection is that it does not cover as much ground as I should like. With a good walking horse, a man with judgment, understanding the art of cultivation, will get over 10 acres a day and do good work.

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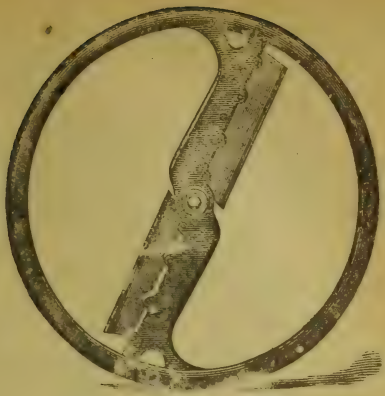
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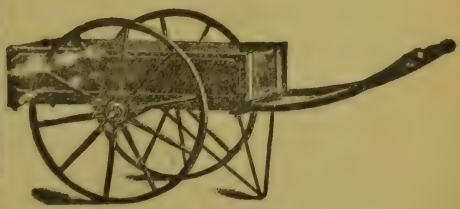
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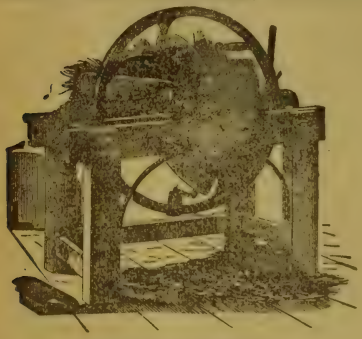


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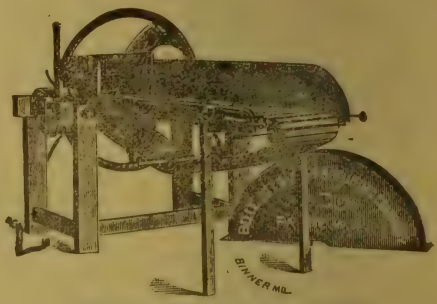
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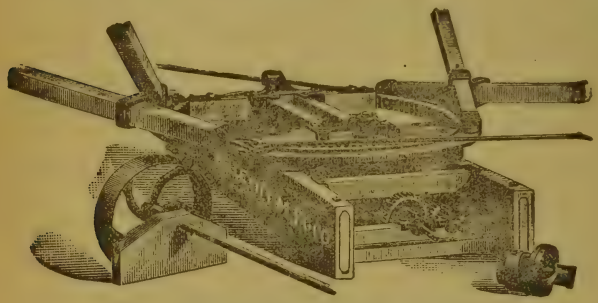
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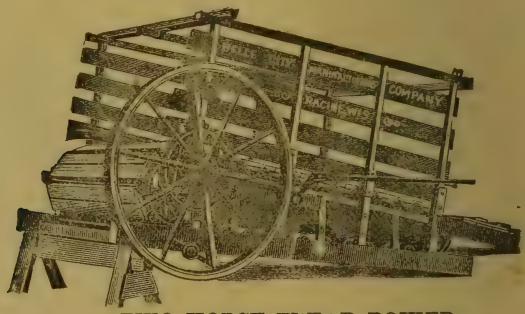
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# West Lawn Herd,

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The time has passed when Jerseys were considered only good as expensive playthings for wealthy farmers. They are going rapidly into the hands of practical men, because they are not only great cream and butter producers, but because they produce cream and butter fat in greater proportion to the food consumed than common stock. This is the vital point in the whole question of stock selection. The farmer who wants to make money believes in the Jersey because when he puts a dollar into her in the shape of feed he can get more than a dollar out if he handles the product properly. The cheap cow is the one that pays the interest on her cost, and a large profit on her feed and care. The expensive cow is the one which does neither. The most expensive cow can frequently be bought for twenty dollars. A cheaper animal can often be bought for one hundred dollars. A common cow costs $25 and will produce 150 pounds of butter per year worth $30 at creamery prices. A good Jersey cow can be bought for $125 that will consume no more and will produce 300 pounds of butter worth $60. The difference in first cost is $100, upon which the interest charge is $7 per year. The difference in value of butter products is $30 per year, in favor of the high-priced cow; deducting the interest on the difference in price we have a difference of $23. This leaves the calves out of the question. The average calf of the Jersey is worth $30. The average calf of the common cow is worth $3. The revenue from the common cow will just about buy feed enough to keep her. The Jersey yields enough to keep her and two more just like her. Can the poor man afford to keep a poor cow?

My stock has been selected largely for dairy purposes, aud has been managed upon the idea that the most valuable dairy stock is obtained from cows that are brought near their limit of butter production. They have never been pampered or overfed, or subjected to any other treatment than is given upon all good dairy farms. A test of fourteen mature cows taken on the morning of July 9, 1890, at the State Experiment Station, indicated an average of 4½ per cent of butter fat. This in the hottest month in the year, when the average is unusually low. The butter yield indicated by this test was 140 pounds per week for the fourteen cows, or 10 pounds per cow per week. A single handful of shorts was fed twice each day.

The bull at the head of the herd is a pure St. Lambert, solid dark fawn, very prominent eyes, deep bodied, and with every indication of the great constitutional vigor of his family. Alphea blood is largely represented in the herd, and some strong line sf Omaha, Lady Mary and St. Lnmbert.

West Lawn Farm adjoins the city of Madison on the southwest. It is one mile from the Mil. & St. Paul R. R. depot. Visitors will be met at trains any time, upon notice, and taken to the farm. Send for catalogue and descriptive circular to

## H. C. ADAMS, Madison, Wis.

**SIR HUGO OF ST. LAMBERT (13726),** who stands at the head of my herd, was dropped Jan. 12, 1881. Bred by R. H. Stephens, St. Lambert, Canada. He is of solid color; black tongue and switch. A very rich Victor Hugo–St. Lambert bull. See his pedigree and notes on opposite page.

**SIR HUGO OF ST. LAMBERT, 13726.**

**Orloff, 3143**
Sire of
Carrie Pogis, 15 lbs. 9 ozs.
Matchless of St. Lambert, 24 qts with third calf.
Grand sire of
Niobe of St. Lambert, 21 lbs. 9½ ozs.
Nell of St. Lambert, 48 lbs. milk, first calf, two years old.
Ida's Stoke Pogis, who sold for $5,000. His daughter gave 45 lbs. of milk per day and sold for $1,650.

**Lucy of St. Lambert, 5116**
Dam of
Cora of St. Lambert, 20 lbs. 8 ozs.
Nancy of St. Lambert, 14 lbs. 5 ozs. with second calf 3 yrs old.
Pet of St. Lambert, who is dam of Diana of St. Lambert, 16 lbs. 8 ozs., who is dam of Nymph of St. Lambert, 13 lbs. 4 ozs., with second calf 2 yrs. 3 mos. old.
Grand dam of
Cowslip of St. Lambert, 17 lbs. 12 ozs.
Ida of St. Lambert, 30 lbs. 2½ ozs.
Allie of St. Lambert, who gave 53 lbs. milk per day and tested at 26 lbs. 12 ozs per week.

**Lord Lisgar, 1066**
Great grandsire of Rubano, 8806, sire of
Duchess of St. Lambert, 15 lbs. 13 ozs. in 7 days.
Clematis of St. Lambert, 14 lbs. 3 ozs.
Jolie of St. Lambert, 15 lbs 13½ ozs.
Sweet Briar of St. Lambert, 22 lbs. 12 ozs.
Lord Lisgar, 1066, sired the dams of
Ida of St. Lambert, 30 lbs. 2½ ozs.
Cowslip of St. Lambert, 17 lbs. 12 ozs.
Minette of St. Lambert, 17 lbs. 4 ozs.
Brenda of Elmhurst, 17 lbs. 4¾ ozs.
Diana of St. Lambert, 16 lbs. 6 ozs.
Nora of St. Lambert, 14 lbs. 7 ozs.
Moss Rose of St. Lambert, 14 lbs. ½ oz.
Juliette of St. Lambert, 13 lbs.
Honeysuckle of St. Anne's, with 2d calf, 14 lbs. 10 ozs.
Jessie Brown of Maxwell, rate of 14 lbs. 7 ozs.
Honeymoon of St. Lambert, 20 lbs. 5¼ ozs.
Lord Lisgar's son, Lord Aylmer, sired Melia Ann, 18 lbs. ½ oz.
Lord Lisgar is g. g. sire of Mary Anne of St. Lambert, 36 lbs. 12½ ozs. in 7 days; Naiad of St. Lambert, 22 lbs. 2 ozs in 7 days; Judith Colman, at 2 years and 11 mos. old, 17 lbs. 5 ozs.; Aldeph Julea, 15 lbs. 1¾ ozs.

**Ophelia, 493**
Dam of Maggie of St. Lambert, 16 lbs. 3 ozs.; 3 years old sold for $3,000.

**Victor Hugo, 197,**
Gave from 12½ to 50 per cent to 55 butter cows, with tests from 14 lbs. 2 ozs. to 36 lbs. 12¼ ozs. Among them he gave 25 per cent to Ida of St. Lambert, 30 lbs. 2½ ozs.; 25 per cent to Sweet Briar of St. Lambert, 22 lbs. 12 ozs.; and 18¾ per cent to Mary Anne of St. Lambert.

**Lydia, 495**
Grand dam of Clematis of St. Lambert, 14 lbs. 3 ozs., who is dam of Honeysuckle of St. Anne's, 21 lbs. 12 ozs.

**Victor Hugo 197**
Victor Hugo has contributed of his blood to the following animals, with records of over 14 lbs, in addition to those shown under the heading of Lord Lisgar of this pedigree:
Mermaid of St. Lambert, [illegible] lbs. 13½ ozs.
Niobe of St. Lambert, 21 lbs. 9½ ozs.
Rioter Pink of Berlin, 19 lbs. 10 oz.
Melia Anne, 18 lbs. 12 ozs.
Crocus of St. Lambert, 17 lbs. 12 ozs.
Dido Miss, at rate of 17 lbs. 1 oz.
Cill of Glen Rough, 16 lbs. 6 oz.
Moth of St Lambert, 16 lbs. 2 oz.
Coquette of Glen Rough, 15 lbs. 1¼ ozs.
Nordheim Creamer, 14 lbs. 7 ozs.
Nancy of St. Lambert, 14 lbs. 5 ozs.
Pearl of St. Lambert, 14 lbs, 2 ozs.

**Pauline, 494,**
Maternal grand dam of
Melia Anne, 18 lbs. 10½ ozs.
Grand dam of
Duchess of St. Lambert, 15 lbs. 13 ozs.
Clematis of St. Lambert, 14 lbs. 3 ozs.
Jolie of St. Lambert, 15 lbs, 13½ ozs.
Sweet Briar of St. Lambert, 14 lbs. 3 ozs.
Great grand dam of
Niobe of St. Lambert, 21 lbs. 9½ ozs.

**On I. of J.**

**Lisette, 492.**
12½ per cent. of her blood to Sweet Briar of St. Lambert 22 lbs. 8 ozs.
Lolie of St. Lambert, 15 lbs. 13 ozs.
Pearl of St. Lambert, 14 lbs. 2 ozs.

**On I. of J.**

**Bonnie, 491.**
Dam of Bonnie 2d, 14 lbs. 11½ ozs.; Grand dam of Unita, 4743, 14 lbs. 10 ozs.

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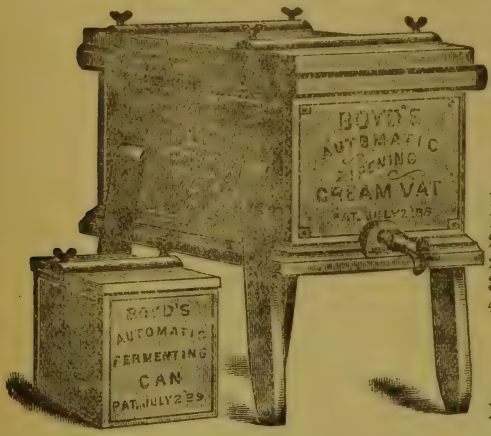
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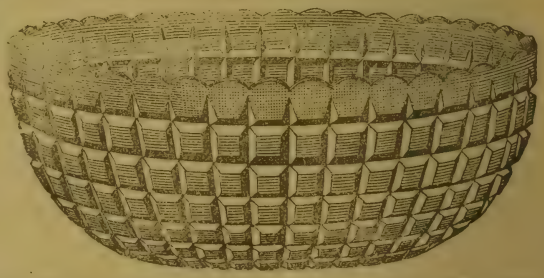
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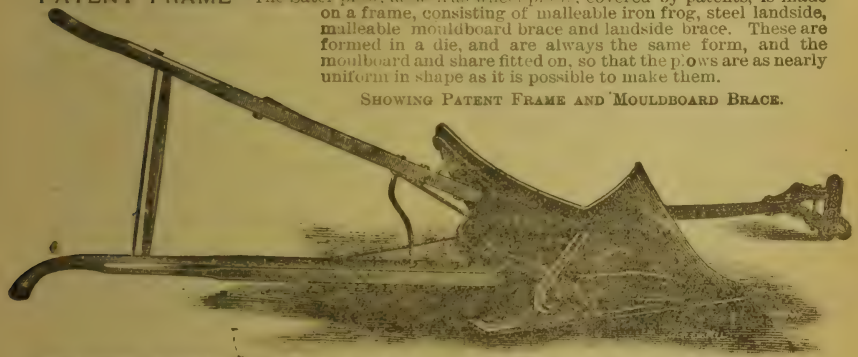
LANDSIDE VIEW, SHOWING HANDLE BRACE.



**Soft Back Mouldboard**; all Steel on the Front.—The illustration shows "Sater" wood beam plow—landside view, showing handle braces. These braces enable us to detach handles without removing bolts in mouldboard.

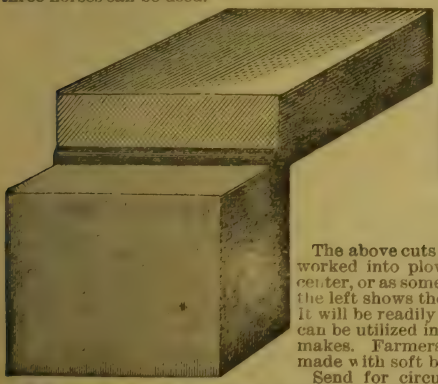
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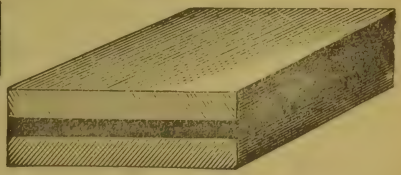
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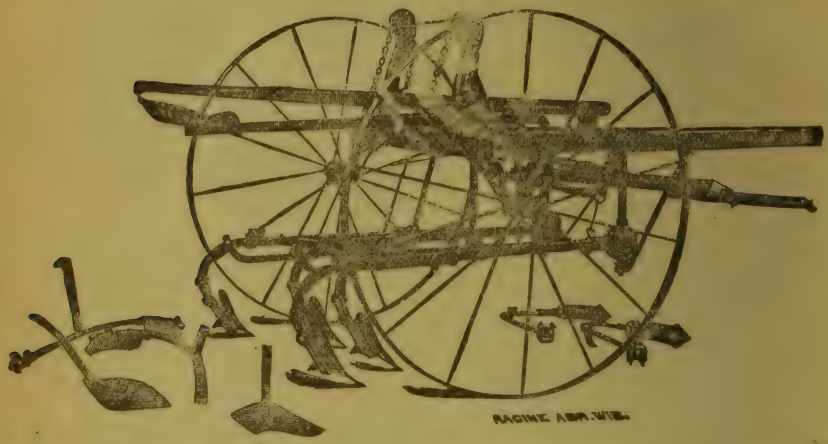
The above cuts represent the different ways Plow Steel is worked into plows. The cut at the right shows the iron center, or as some plow manufacturers make plows; the one at the left shows the soft steel back, or as we make our plows. It will be readily seen that there is double the material that can be utilized in our plows that there is in those of other makes. Farmers will find it of great benefit to buy plows made with soft back and extra case-hardened mouldboard.

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Drag bars are attached to standards so as to swing with the least **possible friction. Beams and** shovels are provided both with friction slip and break pin, to prevent **any possible danger of** breaking shovels. Shovels are extra hardened and will scour equal **to anything that can be had.** Shovels are attached so as to be adjustable in every **way; can be given more curve or set straight; set to throw dirt to or from corn.**

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### SURFACE CULTIVATING.

**These Cultivators are** provided with shovels *plated and sharpened on upper end* **so that when** corn is well grown and there is danger of destroying roots by using pointed **end of shovel and** working deep in ground, the shovel may be reversed and the broad end of same worked in ground, which will destroy all weeds and grass, but will not go deep enough to destroy roots of corn. **Few** farmers fully realize the damage done to corn by deep cultivating after it is well grown and roots are much spread. **Deep cultivating should be done while corn is small and before roots have spead.** **Manufactured by**

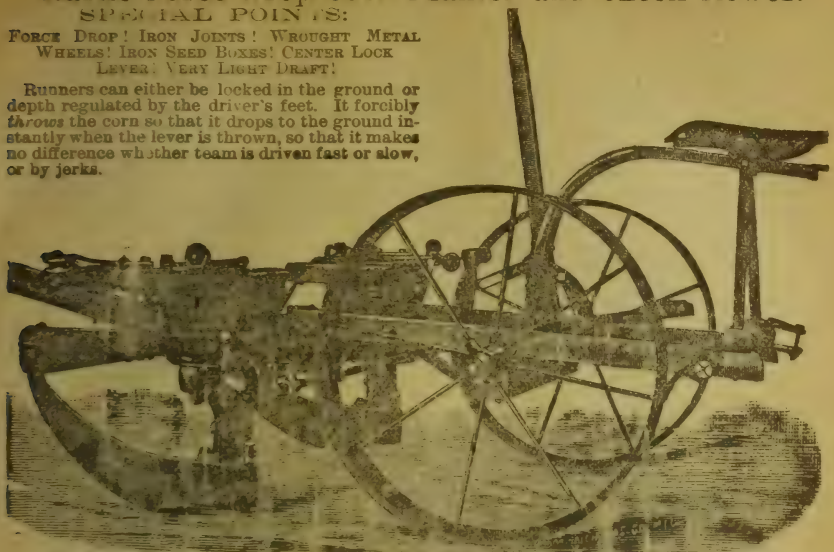
FULLER & JOHNSON MFG. CO.,
MADISON, WIS.

# Starks Force Drop Corn Planter and Check Rower.

SPECIAL POINTS:

FORCE DROP! IRON JOINTS! WROUGHT METAL WHEELS! IRON SEED BOXES! CENTER LOCK LEVER! VERY LIGHT DRAFT!

**Runners can either be locked in the ground or depth regulated by the driver's feet. It forcibly *throws* the corn so that it drops to the ground instantly when the lever is thrown, so that it makes no difference whether team is driven fast or slow, or by jerks.**



The above cut shows our Starks Force Drop Corn Planter and Improved Check Rower.

Will plant corn in straight rows both ways, whether team goes fast or slow. This alone will **save** the price of planter for every 100 acres of corn planted, by not having corn destroyed in cultivating. When raised out of the ground it is self-locking, thus avoiding the use of latches.

It has glass at the heel of the drop so that the driver can at all times see the corn dropping.

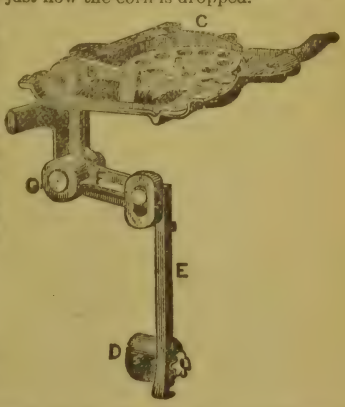
The lock being in the center, the runners go a uniform depth. Planters that lock at the side run deeper on one side than the other, when the planter is locked in the ground.

The runner can be detached in a few moments by taking out two bolts, and can thus be readily sharpened.

In the joints on the frame is an iron plate with flanges which makes the frame perfectly rigid and exceedingly strong, and the water does not settle in the joint to rot the frame.

WE WILL, ON APPLICATION, send by mail a MODEL of the force drop, free of charge, **to any** person who contemplates buying a planter, so he can see just how the corn is dropped.

The accompanying cut shows the working parts of the Rotary Force Drop. The seed plate A is revolved by the pawl B and is locked by the latch C. The roller D receives the corn and is operated by the lever E, causing it to revolve and forcibly discharge the corn into the ground, overcoming any tendency of the corn to scatter as it drops, for the more rapidly the team moves, the more quickly corn is precipitated. The pawl A and the lever E are attached to the bell crank F, which oscillates on the pivot G and operates them both, and the noticeable feature in this device is the small number of working parts involved, which in consequence makes the force drop the most simple, durable, effective and complete dropping arrangement in the market. The corn is always dropped in check regardless of the speed of the team.




## CHECK ROWER.

SPECIAL POINTS.—Made entirely of Iron and Steel, No Wood Frame Across Planter. Great Strength, Easy Movement. Has Fewer Working Pieces than any other.

**DRILL ATTACHMENT.**—An attachment is used for planting the corn in drills, and when it is to be planted for ensilage, making it a perfect drill for this kind of work. Drop a postal for our calendar and account book.

*FULLER & JOHNSON MFG CO, Madison, Wis.*

# T. A. CHAPMAN & CO.

## MILWAUKEE, WIS.



*We are now showing a larger and finer assortment of*

# DRY GOODS

than ever before. All departments are completely filled with goods pertaining to them, and "ORDERS BY MAIL," for either goods or samples, will receive prompt attention.

**BELOW WE GIVE DIRECTIONS FOR ORDERING:**

1st—Write name and address distinctly. 2d—State quality and measurements clearly. 3rd—Say how you want goods shipped. 4th—Put in samples when possible. 5th—Enclose Bank Draft, Express Order, P. O. Order, or send currency by Express or in a Registered Letter. 6th—Goods will be sent C. O. D. when desired, but by remitting with order Collection Charges will be saved.

Small parcels weighing 4 Pounds or less can be sent by mail at the rate of 16 cents per pound the purchaser taking the risk of loss.

In ordering from samples, please make a second choice, in case the first choice should in the meantime be sold.

When ordering samples of Silks, Dress Goods, etc., state prices and colors wanted and also what kind of goods.

## T. A. CHAPMAN & CO.,

*MILWAUKEE, WIS.*

The Annual Farmers' Institute Bulletin is sent free to all residents of the State who request it.

# WISCONSIN

# FARMERS' INSTITUTES;

## A HAND BOOK OF AGRICULTURE.

## NO. 5—1891.

EDITED BY

W. H. MORRISON, Superintendent.

"That art on which a thousand millions of men are dependent for their sustenance, and two hundred millions of men expend their daily toil, must be the most important of all; the parent and precursor of all other arts. In every country, then and at every period, the investigation of the principles on which the rational practice of this art is founded, ought to have commanded the principal attention of the greatest minds."—JAMES F. W. JOHNSON.

MADISON, WISCONSIN.
DEMOCRAT PRINTING CO., PRINTERS AND STEREOTYPERS.

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# LETTER OF TRANSMITTAL.

Hon. Wm. P. Bartlett,

*President of Board of Regents University of Wisconsin.*

Sir:—I have the honor herewith of presenting to you Bulletin No. 5, Wisconsin Farmers' Institute.

Respectfully yours,

W. H. MORRISON.

Madison, Wis., **Nov. 7, 1891** ***Superintendent.***

A 33944

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# UNIVERSITY OF WISCONSIN.

## COLLEGES.

College of Letters and Science.
College of Agriculture,
College of Mechanics and Engineering,
College of Law,
School of Pharmacy.

## COURSES.

Long Agricultural Course,
Short Agricultural Course,
Mechanical Engineering Course,
Civil Engineering Course,
Mining and Metallurgical Engineering Courses,
Railroad Engineering Course,
Electrical Engineering Course,
Law Course,
Pharmacy Course,
Ancient Classical Course,
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General Science Course,
English Course,
Civic-Historical Course, antecedent to Law and Journalism,
Special Science Course, antecedent to Medicine,
Special Courses for Normal School Graduates.

## BRANCHES OF STUDY.

The University presents a very wide range of study, embracing one hundred and seventy-three subjects of study, known as sub-courses. Something of the extent and variety of these may be indicated by the following synopsis: Eleven languages are taught, viz.: Greek, Latin, Sanscrit, Hebrew, German, Norse, French, Italian, Spanish, Anglo Saxon and English. In Mathematics there are twenty-one special courses. Under the Sciences there are a variety of courses in each of the following: Astronomy, Physics, Chemistry, Geology, Mineralogy, Zoology, Botany, Bacteriology. In History there are eleven courses; in Civics, thirteen; in Mental Sciences there are fourteen, embracing Psychology, Ethics, Aesthetics and Logic. There are six courses in Pedagogic and courses in Military Drill, Hygiene, Sanitation and Music.

# UNIVERSITY OF WISCONSIN.

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**In Mechanics and Engineering:**—Elementary Mechanics, Mechanics of Material, Mechanics of Machinery, Theory of Construction, Thermodynamics, Elementary Surveying, Railroad and Topographic Surveying Geodesy, Sanitary, Hydraulic, Railroad, Electrical, Mining and Metallurgical Engineering, Steam Engine, Hydraulic Motors, Hoisting Machinery, Theory and Construction of Locomotives, Railway Locomotives, Railway Location, Railway Equipment, Construction and Maintenance of Way, Railroad Field Work.

**In Electricity:**—Electrical Testing, Electrical Plants, Electrical Construction and various forms of drawing are given; also, shop work in wood, iron, brass, both hand work and machine work, machine designing, construction and testing machines.

**In Agriculture:**—Various courses are given in agriculture: Animal Husbandry-Farm Management, Agricultural Chemistry, Veterinary Sciences, Agricultural Physics, Horticulture and Economic Entomology, etc.

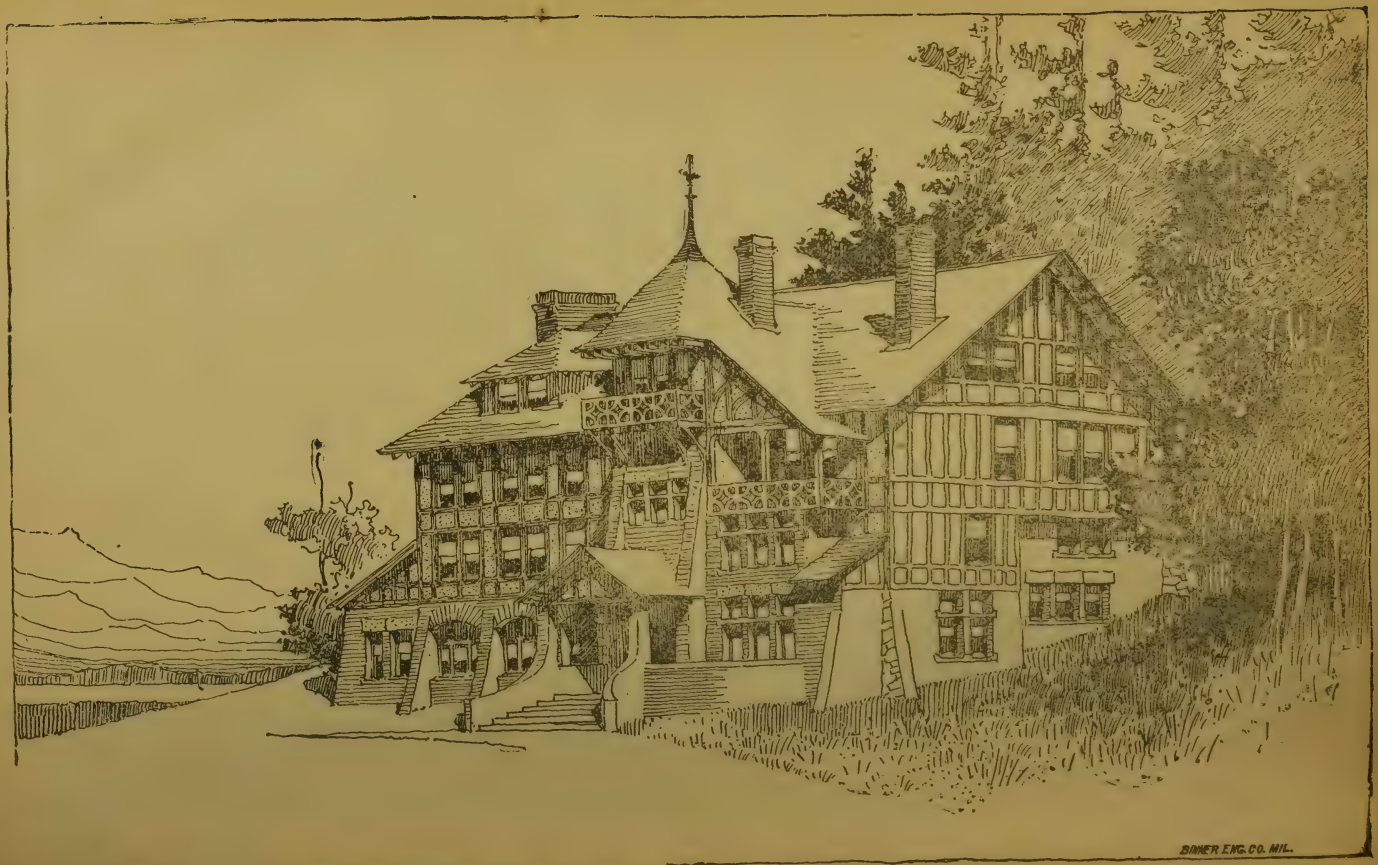
**In Law:**—Courses in Equity, Jurisprudence, Real Property, Constitutional Law, Wills, Contracts, Torts, Practice and Pleading, Law of Evidence, Corporations, Domestic Relations, Admirality, Insurance, Estoppel, Partnership, Taxation, Criminal Laws, Common Carriers, Medical Jurisprudence, etc.

**In Pharmacy:**—Courses in Practical Pharmacy, Pharmaceutical Chemistry, Materia Medica, Pharmaceutical Botany, and Practical Laboratory Work.

**General Facilities:**—The Faculty embraces upwards of seventy instructors. The laboratories are new, extensive and well equipped; embracing the Chemical, Physical, Metallurgical, Mineralogical, Geological, Zoological, Botanical, Civil and Mechanical Engineering, Agricultural and Pharmaceutical Laboratories. *Seminars* for advanced study in History, Language, Literature, Mathematics, and other branches are being developed.

The libraries accessible to students embrace that of the University, 23,000 volumes; of the State Historical Society, 138,000 volumes; of the State Law Department, 23,000 volumes; of the City, 11,000 volumes, besides special professional and technical libraries, making in all more than 200,000 volumes, thus affording very exceptional opportunities for reading and special research.

**For further information send for a catalogue, or address the President or the head of the department concerning which information is desired.**




HIRAM SMITH HALL—Dairy Building, University of Wisconsin.

# AGRICULTURAL INSTRUCTION

AT THE

# UNIVERSITY OF WISCONSIN.

---

The College of Agriculture at the University of Wisconsin maintains a number of courses in Agriculture of such nature that an industrious, ambitious young farmer may find some one of them adapted to his needs, the time he can give, and in cost ranging from that of a full four year's course with its attendant expenses, down to a single term of 12 weeks the necessary cost for which is exceedingly small.

## THE SHORT COURSE IN AGRICULTURE.

The Short Course in Agriculture is designed to meet the wants of young men who intend to follow farming and feel the need of increased knowledge in their chosen vocation, but who can give only a limited amount of time to preparation and study. The studies, laboratory work, etc., in this course have been arranged to give the largest amount of information along intensely practical lines without undue crowding. When the course was started seven years ago, a student could take all the studies in a single winter term of 12 weeks. Now the instruction is given by eight professors and lecturers, and the list of studies has been increased until the student must spend two winters with us if he wishes to take all of the studies in the course. For the winter term beginning January 4, 1892, the following is the list of subjects treated in the Short Course.

### Feeds and Feeding.

PROF. W. A. HENRY.

The lectures will treat of the laws of nutrition; feeding standards; feeding for growth, fat, milk, etc. Each of the common feeding stuffs employed by our farmers will receive careful attention, and its properties and possibilities noted. The aim of the work is to aid the student in becoming an intelligent feeder of live-stock, utilizing each product at hand in the very best manner. The subcourse will consist of thirty lectures extending through the term.

## Breeds and Breeding.

PROF. JOHN A. CRAIG.

These lectures will treat of the various breeds of our domestic animals, with descriptions and characteristics of each. The student will be prepared as far as possible not only to judge stock well for his own personal gain, but also that he may become an expert in the show ring where live-stock is gathered for exhibition and competition. In the theory of breeding, the subjects of heredity, atavism, prepotency, variation, in-breeding, line-breeding, etc., will be carefully discussed. The observing student should gain from this study facts of the highest importance in the management of live stock. The subcourse embraces thirty lectures besides a study of pedigrees, extending through the term.

## Agricultural Chemistry.

L. S. CHENEY, FELLOW IN BOTANY.

Here will be discussed such topics as, chemical elements contained in soil, air, crops, manures; soil,—formation and classification; water and air, as a source of plant food; the plant, how it grows and feeds; manures,—necessity for, kinds, value of stable manure, affected by food eaten; commercial fertilizers fermentation and decay. Three lectures per week.

## Agricultural Physics and the Physical Features, Climate and Meteorology of Wisconsin and the United States.

PROF. F. H. KING.

The work in Agricultural Physics will deal with relations of water to soil; movements of water in soil; purposes, methods and instruments of tillage; soil temperatures, and methods of modifying them; questions of drainage; water supply for stock and the kitchen; construction of farm buildings; ventilation and lighting of barns and dwellings; permanent and portable fences; farm motors. One lecture daily, with laboratory work additional.

## Horticulture and Economic Entomology.

PROF. E. S. GOFF.

These lectures will embrace methods of propagation, planting, cultivation, pruning, marketing and preserving the fruits of our climate; instruction in the growing of garden vegetables, the construction and management of hot-beds, forcing-pits, etc.; the culture and adaptation of flower garden and greenhouse plants; the principles of ornamental planting, and of laying out gardens and pleasure grounds, and the formation and management of lawns; methods of seed growing, the principles of selection and the art of cross fertilization with the view of improving varieties; also the classification of insects, the principal injurious and beneficial insects of our climate, with the means of preventing insect ravages. One lecture daily; laboratory work additional.

## Practical Mechanics.

PROF. C. I. KING

This course embraces work in the University Machine Shops, covering bench work in wood, wood turning and blacksmithing, and the work is so planned and directed as to cover the fundamental principles of each. The student will be able when he gets through to turn a chisel-handle or neck-yoke and to iron a whiffletree or forge a pair of tongs. Requires two hours' time, daily, in the shops at forge and bench.

## Dairying.

DR. S. M. BABCOCK AND MR. F. H. WORTHINGTON.

Short Course students desiring dairy instruction will take the lectures in dairying, 24 in number, by Dr. Babcock, along with the Dairy School class. Mr. Worthington will give laboratory instruction in the use of the milk test and the lactometer. Following this he will direct the class in a study of the various systems of cream separators such as the centrifugal hand separator, and deep and shallow setting. Three forms of the hand centrifugal separator are provided. Practice will be given in churning, working, packing and judging butter. Two lectures weekly, besides laboratory practice and work in the dairy room.

## Veterinary Science.

C. A. WOODFORD, V. S.

In this course the needs of the stockman in the care and handling of farm animals will be constantly in mind. The aim will be to teach the pupils to locate and detect the more common ailments of our domestic animals, and give instruction in preventing and curing them. While the purpose of the course is to help young farmers, it will prove of material value to those who later intend to enter a veterinary college. Animals treated by the lecturer in his local practice will be used for illustration. As aids to the work, the department has the skeleton of the horse and cow; the Auzoux life size, desectible model of the horse, containing three thousand named parts; Auzoux models of diseased parts etc. One lecture or demonstration daily.

## THE DAIRY COURSE.

The Dairy School is an outgrowth of the Short Course. Young men wished to prepare themselves for operating cheese factories and creameries, and to meet the wants of such, a specific course in Dairying was started in 1889. Last year 72 students were in attendance at the Dairy School. The large attendance and and the great interest shown has led to the construction of a dairy school building commensurate with our wants. A view of this building is given at the beginning of this article. The Dairy Course for 1892 opens January 4, with the following list of subjects.

## Subcourse I — Lectures and Class-room Work.

(1) Twenty-four lectures by Dr. S. M. Babcock on the constitution of milk, the conditions which affect creaming and churning, the various methods of milk-testing, the preservation of milk, and other allied subjects. In addition to the lectures, Dr. Babcock will give instruction by frequent recitations and other class work, involving practical questions relating to the dairy.

(2) Eight lectures by Prof. F. H. King, on heating, ventilation, and other physical problems directly connected with dairy practice.

(3) Ten lectures and demonstrations by A. W. Richter, Fellow in Engineering, on the care and management of the boiler and engine.

(4) Ten lectures by Dr. C. A. Woodford on the common diseases of the dairy cow.

(5) Eight lectures by Prof. W. A. Henry, on the feeding and general management of dairy stock.

These lectures, sixty in number, will be given, one daily, through the whole term. The recitation and class-room work by Dr. Babcock is additional.

## Subcourse II — Milk Testing.

Instruction will be given in the laboratory by Dr. Babcock and Mr. F. H. Worthington, in estimating the fat in milk, butter and cheese by methods adapted to the factory and factory operators. Instruction will be given in the use of the lactometer and other simple tests. Those taking the work will be fitted to determine the fat content of any sample of milk, and, so far as possible without a complete analysis, to judge whether milk has been watered or skimmed. The efficiency of this subcourse is increased this year by the addition of instruction in a practical method for determining the fat in cheese.

## Subcourse III — Butter-Making.

Instruction will be given by Mr. H. J. Noyes assisted by Mr. John Seaman and one other person to be appointed later. The processes of butter-making will be carried on each day on the creamery plan, from analyzing the milk at the intake to shipping the packages from the refrigerator. In the creamery will be found several different kinds of power centrifugal cream separators, the butter extractor, and hand separators suitable for private dairies. Students in the creamery will be required to make daily tests of the milk used, the skim milk and the butter milk, and to determine and locate any losses which may occur. To further increase knowledge and give training, samples of butter will be secured from different sources, and scored by the students.

## Subcourse IV — Cheese-Making.

This subcourse will be in charge of Mr. J. W. Decker, instructor in Dairying, assisted by Mr. George W. Brasure and Matthew Michels. Daily instruction will be given in the manufacture of milk into cheese. The milk and whey will be tested so that the losses in the process of manufacture will be located. Samples of cheese from different sources will be secured, and the students taught to estimate their worth and to recognize the demands of the market.

All students taking subcourses III or IV will be required to take the first two subcourses.

The instructional force in the Dairy School for the winter of 1892, numbers 12 persons in all; 5 lecturers on dairy subjects, 3 instructors in the creamery, 3 in the cheese factory, and 1 in the dairy laboratory.

## Advanced Dairy Work.

Those students who have had considerable previous training, after they have been with us a few weeks will take up advanced work in butter and cheese making. This will be largely of an experimental nature and should prove exceedingly interesting to all concerned.

## Dairy Certificates.

Students having two years experience in a cheese factory or creamery and having taken all of the lectures, laboratory and factory work, and having passed satisfactory examinations, will be entitled to dairy certificates.

## The Long Course in Agriculture.

The Long Course in Agriculture requires preparation equal to that of other courses in the University and leads to the degree "Bachelor of Agriculture." This course gives the student a liberal education along lines relating to agriculture. The sciences of chemistry, physics, botany, zoology, etc., receive especial attention. The student sits with other scientific students in general classes and recites with them during the first years of his stay with us, but gradually takes more and more work in Agricultural Hall, until the last year, when the most of his time is spent upon scientific agricultural studies. Those who wish to prepare themselves for teachers in agriculture or for Experiment Station work, should take this course. It is especially adapted for those young men who wish to prepare themselves for farming in the broadest sense of the word, and who believe that farming offers ample opportunity for well trained minds, both from the financial side, and more largely from the enjoyment of a well developed intellect in rural pursuits.

## Expenses.

This is an important part of the subject with most young men. No tuition fees are required by the University. All students pay an incidental fee of $5 per term. Short Course students who take machine shop work pay a fee of $5 for the iron, wood and coal used by them. Dairy students pay $1 for milk testing, $3 for butter making, $3 for cheese making, or $5 for both.

Furnished rooms can be rented at from 75 cents to $2 per week. Table board ranges from $2.10 to $3 per week.

Long Course students should present themselves in September. Short Course and Dairy students come about the first of January. The Short Course and Dairy Course for the coming season open January 4, 1892.

For further information regarding the Agricultural Courses of instruction, write to,

**PROF W. A. HENRY,**
*Madison, Wis.*

# LIST OF INSTITUTES, 1891-2.

| | |
|---|---|
| West Salem | Dec. 1-2 |
| Viroqua | Dec. 3-4 |
| Kenosha | Dec. 8-9 |
| Racine | Dec. 10-11 |
| Wauzeka | Dec. 15-16 |
| Muscoda | Dec. 17-18 |
| Lone Rock | Dec. 21-22 |
| Prairie du Sac | Dec. 23-24 |
| Hortonville | Dec. 29-30 |
| Beaver Dam | Jan. 5-6 |
| Ft. Atkinson | Jan. 7-8 |
| St. Croix Falls | Jan. 12-13 |
| Clear Lake | Jan. 14-15 |
| Mondovi | Jan. 19-20 |
| Augusta | Jan. 21-22 |
| Independence | Jan. 26-27 |
| Hixton | Jan. 28-29 |
| Dorchester | Feb. 2-3 |
| Greenwood | Feb. 4-5 |
| Weyauwega | Feb. 9-10 |
| Marshfield | Feb. 11-12 |
| Seymour | Feb. 16-17 |
| Scandinavia | Feb. 18-19 |
| Reedsburg | Feb. 23-24 |
| Belleville | Feb. 25-26 |
| Manitowoc | Mch. 1-2 |
| Port Washington | Mch. 3-4 |
| Hartford | Mch. 8-9 |
| Menomonee Falls | Mch. 10-11 |
| Friendship | Dec. 1-2 |
| Plainfield | Dec. 3-4 |
| Princeton | Dec. 8-9 |
| Montello | Dec. 10-11 |
| Fennimore | Dec. 15-16 |
| Dodgeville | Dec. 17-18 |
| Sun Prairie | Dec. 21-22 |
| Blue Mounds | Dec. 22-23 |
| Oconomowoc | Dec. 23-24 |
| Fond du Lac | Dec. 29-30 |
| Hudson | Jan. 5-6 |
| River Falls | Jan. 7-8 |
| Menomonie | Jan. 12-13 |
| Durand | Jan. 14-15 |
| Shamrock | Jan. 19-20 |
| New Lisbon | Jan. 21-22 |
| Sparta | Jan. 26-27 |
| Elroy | Jan. 28-29 |
| Elkhorn | Feb. 2-3 |
| Mukwanago | Feb. 4-5 |
| South Wayne | Feb. 9-10 |
| Brodhead | Feb. 11-12 |
| Palmyra | Feb. 16-17 |
| Morrisonville | Feb. 18-19 |
| Kilbourn City | Feb. 23-24 |
| Rio | Feb. 25-26 |
| De Pere | Mch. 1-2 |
| Plymouth | Mch. 3-4 |
| Eureka | Mch. 8-9 |
| Rosendale | Mch. 10-11 |

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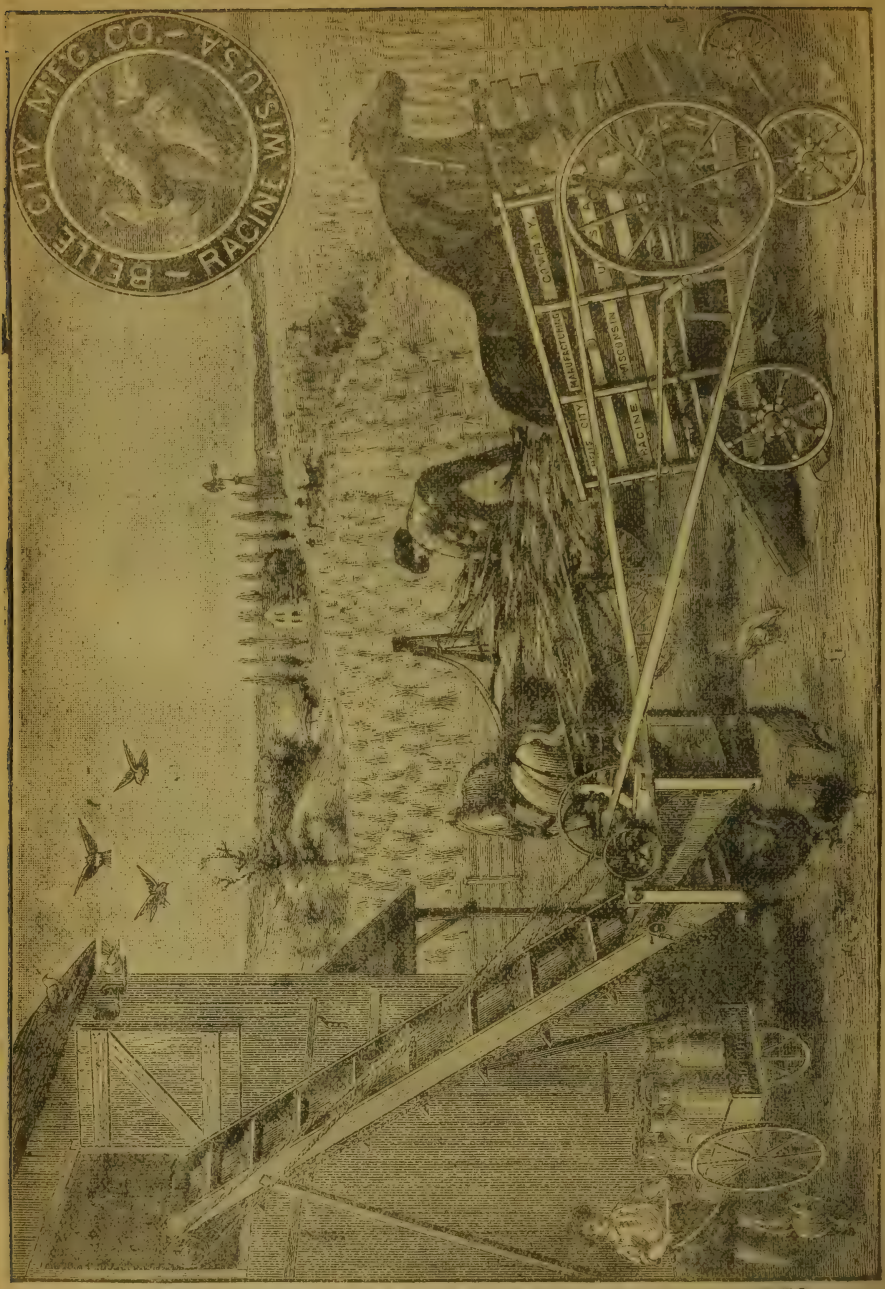
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# Closing Farmers' Institute,

Held at Waupaca, Wis., March 17, 18 and 19, 1891.

## MORNING SESSION—MARCH 17th.

Supt. Morrison in the chair.

Address of welcome by Mayor Nelson.

*Mr. President, Ladies and Gentlemen:* In behalf of the citizens of Waupaca I extend to you our most hearty welcome, hoping that while you stay in our city and attend this institute, that the hospitality that you receive at our hands may be such that at the close of this institute you will move unanimously to hold your closing institute here in 1892.

Gentlemen, I am not a public speaker but it gives me pleasure to voice the sentiments of co-operation and good will that our citizens have toward the Farmers' Institutes, for they have been of immense benefit to our county. Two years ago when you held an institute at this place our farmers were discouraged, as our chief crop, potatoes, were only bringing 15 to 20 cents a bushel, but your talks and discussions were conservative and helpful. Your advice was continue to raise potatoes, but endeavor by sowing clover seed and keeping more live stock to increase the yield of potatoes.

The Farmers' Institutes have been worth thousands of dollars to our county. I wish that I could give you the number of bushels of potatoes raised in Waupaca county, but I cannot. In this city alone 1,684 cars have been shipped the past fall and winter, being over one million bushels, that has given to our farmers over $800,000.

We are glad to see you and hope that the exchange of experiences and opinions may be very beneficial.

Again we bid you welcome and hope that your meeting may be pleasant and profitable.

SUPT. MORRISON—I notice by your programme that I am to respond to the cordial welcome that Mayor Nelson has extended to our institute corps, but you will pardon me if I call a gentleman, who is well known throughout our state as well as in many other states of the Union who will respond to the address of welcome. It gives me pleasure to introduce Ex. Gov. Hoard.

*Mr. Mayor, Ladies and Gentlemen, Fellow Farmers in Distress:* I esteem it an honor to be selected to voice the acknowledgment and thanks of this institute corps for the very hearty, direct, sensible, straight forward welcome we have received at the hands of the mayor of Waupaca. You know there is an old saying that "Speech is silver, but silence is gold." Thousands of men think more than they can speak. In this case we are thanking the people of Waupaca for the tender of their hospitality, and we are at the same time considering the importance of this institution.

We little understand, my friends, as we toil day after day upon our farms or in our shops or at our counters, unless we give it thought, how the constant growth of human labor is modifying the fortunes of our state. We little understand how important it is that that

labor should be wisely directed; we little understand the value of intelligent labor and intelligent thought. We are all of us laborers in this great vineyard. Some of us are hired at the eleventh hour and we are offered a penny and some of us have started in the morning and have hired at the same price, and some of us kick because we don't get any more for a full day's work than those hired at the eleventh hour. Some of us look around and see this man and that man getting rich and we get discontented with the farm. Now, if we can have anything that will sweeten that labor, that will make us more contented with the farm, if we can find anything that will give us a larger view, lift us up just a little, so we can see a little farther, we ought to thank God for it and take courage. We all need that wider vision. We have any quantity of men who are so narrow in their application of God's mercy to man that the world gets but little encouragement for their living in it. Here is the great broad principle of agriculture. It demands the largest exercise of brain and we want to give it a little larger look. We want a little more wisdom. Why, my friends, when I read the Bible, and I do read it a great deal, I find it is a depository of wonderful wisdom in the experience of men; I turn to that passage where God said unto Solomon "Which will thou have, wisdom or riches?" Solomon thought it all over and he could have chosen great riches. But, no, he chose wisdom and he got both; wisdom brought him riches, but riches never would have brought him wisdom. Now, don't we need wisdom? We need it every day. There stands a circle of potatoes nailed up against that wall. What do they represent? Do they represent simply the clod of earth that they laid in to ripen? No, they represent the *thought* of the man that planted them and finally the thought of the man has nailed them against the wall, and made of them a picture of beauty and usefulness to our thought. What prompts this? Wisdom. And this is what the institute work is designed for; to foster wisdom and good thinking along these lines, to set the mind thinking, thinking, thinking.

You know that a good many men behind the plough don't think any more than the horse ahead of it. I have seen men, when they were not thinking about the ploughing half as much as the horse and the result was, cut and cover, cut and cover, and half the ground was not ploughed. No man has any business to despise the work of the farm, for the farmer is the great food producer of the world. Is it a small or foolish thing to produce food? Is it a narrow thing? No, it is the biggest think on earth to wisely produce food.

The farmer is the only man that does it and how should he do it? By being wise unto the laws that God hath given for the production of that food. Wisdom here consists in a proper understanding of those laws.

My friends, this institute work started a few years ago in Wisconsin through the deliberations and discussions of the Wisconsin Dairyman's Association. I remember an executive meeting held in Milwaukee when we came together and talked over this matter of organizing farmers' institutes and it orginated there among that body of earnest men who believe as they believe in their lives, in the value of agitation, agitation of thought.

Why, you may have the best cream in the world, if you don't churn it, it will always remain cream and you will never

get any butter out of it. You may have the best head on the earth, if you don't agitate the thought in it, you will never get any results out of it, and so thinking, the constant agitation of thought, leads finally to the larger reward of the hand. We should learn to think more accurately that we may work more accurately, and more certainly put the reward in our pocket, and add to our comfort and our babies, and our wives,—I mean add to their comfort, not add to the babies or the wives, that is a matter of your own business, not mine.

This winter I came back from other states to Wisconsin and I felt ashamed. I find men fighting this institution, fighting the progress of agricultural thought, fighting the idea of farmers getting together and thinking about and discussing their own business. I find those men trying to tear down the Farm Institutes as though they thought they were doing God's service. They strive to work up a prejudice by calling it a political machine, and this, and that. I leave and go to Canada. I work there in a convention and I find men coming to me every day and saying to me "What a magnificent piece of work you are doing in Wisconsin, the bulletins that you have sent out have done us immeasurable good." Then I go over into Vermont, as I did on the 13th of January, and I find men coming to me saying: "Tell us about the Wisconsin institutes." Calling me up repeatedly in the convention to tell them about Wisconsin institutes and I find Wisconsin fame, honor and credit raised in the estimation of the people of the Green Mountain State by reason of the Farm Institutes. Then on January 16th, I went to Winthrop, Maine, and it was the same there. Then on the 20th of January I went to New Hampshire and there the same questions: "Tell us about Wisconsin Institutes." In December I was at Worcester, Mass., and I met the same question there, and again in Walton, N. Y. Everywhere I go, every successful man in farming recognizes the great value, force and strength of these farmers' institutes, which shall take hold of the farmers and unite them in an intelligent study of that which maketh for peace and righteousness and a better reward of agricultural effort.

Now, these things are in the line of intense common sense. I would not give a fig for any sense that is not common enough to be down where I live. We have watched and prayed and worked for these institutes that they might make the waste places of our beloved state to blossom as the rose and they have helped to do it. They have done a vast amount of good, because they have brought us together, and when we come together we warm and cheer each other, don't we? When men come together and honestly, patiently and intelligently think with one another concerning the things that interest them so much, they are bound to help one another. My friends, the institute work of our state is a blessed work if we can keep it along this line.

We want to hold right steadily in the conduct of the institutes to the technical work of the farm. We don't want to dabble in politics, we don't want to mix up in religion, we don't want to mix up with anything on earth, but stick to this. Give to me a larger judgment of my duty as a farmer, and how to encompass the problems of my work and then I will bless the institutes. The judgment of men is enhanced and enlarged and benefited by rubbing together. You know the old fashioned

saying in Vermont when they go sleigh riding and the boys and girls all tumble into the sleigh. "Lay the brands close if you want a good fire." You need that motto here in the institute work, we need it in the state. There is no man that needs to range up alongside of his neighbor more than the farmer and may God bless him in his efforts in that direction.

## MANURE AND FERTILITY.

GEORGE MCKERROW, Sussex, Wis.

*Mr. Chairman, Ladies and Gentlemen:* This is a pretty big subject to talk about in a few minutes, and as Gov. Hoard suggested, I think it will be "cut and cover."

The great Creator, in giving us this globe for a home, laid down some laws that worked well for thousands of years, yes, probably for mi lions of years. The elements have been acting upon the surface of our soils, dissolving and making soluble the mineral matter in them and growing crops of plants that have gone back again upon the soil and given fertility to it until to day we are enabled to raise good crops. In this country of ours, with our virgin soil to work upon, we have been growing crops, grains mostly, and sending them to the open markets of the world. We have been selling off the fertility of our soil by the bag full.

*No Country under the sun*

has ever been so prodigal of the fertility of its soil as this United States of America.

But the time has come for us to make a halt, to begin to think what we are coming to. In fact in many portions of our country we have found out from experience what we are coming to if we continue in this wasteful course. Looking across the ocean to the old countries of the world, to England, Germany and France, and further yet, over to China where they have been cultivating the soil for hundreds, yes, thousands of years; we see that they have learned the lesson of caring for the fertility. They save everything there that will fertilize the soil, saving the sewerage of their cities, saving the silt that is washing down from the rivers, scooping it up and placing it upon the land, drawing fish out of the seas to fertilize with, and the Chinaman go so far that it is said they will not allow the body of a Chinaman to be buried in this country but ship it back to China so that nothing may be lost.

When we began to draw upon our soils for crops and kept it up, we were very much like the manufacturer who put in a good stock of material, wood, iron and coal to begin with, and then continues to manufacture without buying any new material. If he keeps on in this way he soon gets to the end of his business. So with the farmer. He must keep a store of fertility in his soil or he must cease raising paying crops.

*What is Fertility?*

It means those elements in the soil that are available for plant food. We find in many soils when the chemist analyses them, a goodly amount of fertility but its being in an insoluble condition,

and not available for plant food, those soils do not produce good crops. We find one class of elements that may be termed organic or gaseous. These elements are supplied to our soils mainly by the decomposition of vegetable matter.

We term them Oxygen, Hydrogen, Nitrogen and Carbon. Only one of these is very valuable in the growth of plants, yet they are all needed, they all have some relation to the making available of other elements in the soil.

Then we find another class of elements that may be termed inorganic or mineral elements; they come from dissolving earth, rock, etc., and we find them in the shape of potash, sulphuric acid, phosphoric acid, magnesia, lime, chlorine and silica.

The principal elements in the growth of plants are nitrogen, phosphoric acid and potash. Now, by the thorough cultivation of the soil, we aid in making these elements in the soil soluble, or fit for plant food. The air, the sunlight and moisture are all constantly at work; they are carrying on a mechanical and chemical action which puts these elements in a favorable condition to be taken up as plant food. Now, the more we cultivate and open up this soil, so that it may breathe, so that the air may penetrate it and the moisture may pass through it both up and down, the more rapidly we make these elements available for the plant.

Therefore, I say we should strive to give thorough culture and plenty of it. Yet that adds comparatively nothing to the soil. We must add to that soil in another way and that brings us to the second part of our subject.

*Manure.*

Prof. C. G. Frierthonger, of England, says that by thorough culture the farmer can get much better crops and can exhaust his soil much sooner than by less thorough culture, yet he advises the getting of as large crops as possible, and at the same time advises the applica ion of manure for growing crops to keep up the fertility of those soils. When we come to the question of manures we must not fall into that erroneous habit of looking upon all manures as being equally valuable. The rotted straw pile has but little value when compared with the manure made from well fed fattening cattle.

*The English Farmer*

well understands the value of manure. He has studied it for centuries, and we find him feeding those foods which give rich manure very freely to his stock. We find him feeding eight to twelve pounds of oil meal at a time to his fattening steer, when it is pretty well known now that such a steer will only utilize from five to six pounds of this oil meal to the best advantage in putting on flesh, but the English farmer reasons that what he don't get in flesh he gets in fertility. It will pay us to feed stock the material necessary to keep up the nitrogen in the soil, and unless we do feed stock and grow clover the fertility of our soils will after a while become exhausted and we will have to work our farm at the halves, that is, we will have to expend the work and have only half a crop and we might just as well become renters and work the land at the halves as to work our own farms in that way. Now, the feeds that we have access to in this country that will produce rich manures are such as cotton-seed meal, oil meal, bran, middleings, oats and clover. Such feeds as corn, straw and slough hay are not as rich in these nitrogenous elements, and therefore, do not give us as rich manure.

*A Costly Mistake.*

In feeding our stock and handling our manure, we in the state of Wisconsin, are making a great mistake. We are allowing a great deal of our manure to go to waste. From 40 to 60 per cent. of the manurial value is found in the liquid portion of the manure, and when we bore holes in our stable floors to get rid of this liquid we are losing over half the value of our stable manure. We should be careful to have on hand good absorbents such as we have on the farm in straw, coarse slough hay and to a certain extent land plaster. These absorbents placed in our stables will hold this liquid manure until we can get it upon the soil, which should be as soon as possible.

Don't throw this manure out into the yard to be washed by the spring and summer rains, and hauled out next fall, when we have lost the best portion. Get it upon the land, let the rain wash it in and incorporate it into the soil where it is needed. If we leave it in the yard we will lose interest on it the same as we lose interest on a roll of green backs we carry in our pockets. Let us get the best results by top-dressing.

MR. ROBINSON — What is the nature of your soil?

MR. MCKERROW — Ours is a clay soil. The scientists tell us that the tendency of manure is both upward and downward. In wet weather the fertility is carried downward, in dry weather when the moisture is coming up by capillary attraction it brings back a portion of the fertility to the surface, but not above the surface. The question is often raised, how much we lose in our manures by evaporations, but the scientist tells us that the vapor that is given off from manure that is not heating, though it has a strong odor, does not carry much fertility with it. The young plant should be encouraged and helped, and if we plow under our manure we put it down where it is pretty hard for the young plant to get to it. If we keep the fertility near the surface, the young plant gets the benefit of it. The clover plant, is a great aid in keeping up the fertility of our surface soils from the fact that it reaches down into the sub-soil for many of the elements that make its growth and bringing them up, deposit them near the crown of the plant where they are available for future crops.

*We Sometimes Have Rough Manures*

that we do not wish, or from some cause cannot haul out upon our fields at all times of the year, that we have to pile up. In my practice I have found it was best to haul out and use a layer of the poorest straw manure for the bottom then pile up the manure as it increases in quality upon that, so that we have the richest manures on top of the pile. Pile from three to four feet deep unless it be horse manure, which we would pile shallower, with the level rather sloping toward the center. What rain falls upon this pile is very little more than necessary to keep down fermentation. The straw below will catch and hold the greater portion of the fertility. Such a pile can be kept and used for top-dressing, for roots or any other crops. We find this good top-dressing for the winter wheat crop, applied and dragged in with the seed.

Farmers in Wisconsin sometimes use salt and plaster. These might come under the head of commercial fertilizers, but as analyses show, they are not very rich in fertility; their benefit is mainly found in the action that they have upon

the elements already in the soil, through making them more available as plant food.

They also seem to draw moisture to the surface of the soil. We cannot be too careful in saving our manure.

Eastern farmers pay at the rate of 17 cts. a pound for nitrogen, and from 7½ to 8 cts. a pound for phosphoric acid, from 3 cts. to 6 cts. a pound for potash. Figuring on that basis we find that a ton of bran contains something over $12 worth of these elements, a ton of hay something like $9.00, a ton of oats some $6.00 or $7.00 worth, a ton of oil-meal some $19.00 worth. If we follow on our farms a continuous cropping, and selling of the crops, we will have to do as they do in the east before long, so it will pay us to be careful in this respect.

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*DISCUSSION.*

GOV. HOARD — Did I understand you to say that where manure is thrown together and heated up that it may through fermentation and evaporation lose some ammonia, but there is not much loss of fertility?

MR. MCKERROW — When it is spread out upon the surface of the soil the scientist tells us there is not much loss of fertility, but in the pile where fermentation is going on and where heat is being generated, there is considerable given off.

MR. BENEDICT — You spoke about using some absorbent. Do you consider that mill shavings used in that way are liable to do injury to a light soil?

MR. MCKERROW — I have had no experience with pine shavings, but I should judge that the benefit derived from their decomposition would be largely offset by the turpentine in the shavings.

MR. EVERETT — Would you advise piling horse and cattle manure together, and would it be a benefit to sprinkle land plaster over that?

MR. MCKERROW — Yes, I would advise both those things. We use land plaster on our manure piles and in the sheep yards.

GOV. HOARD — Land plaster is sulphate of lime and composed very largely of sulphuric acid, which is a constant disintegrent; it breaks down the woody fibre, etc.

MR. MCKERROW — It combines very readily with potash.

MR. FAVILLE — Do you recommend the sowing of land plaster on the soil?

MR. MCKERROW — On many soils I think land plaster is valuable. We find upon clay soils in particular, that it gives a very rapid growth to the clover plant, yet I do believe that if we sowed land plaster every year upon those soils, we would ultimately use up the available potash in them, and possibly make the land what is termed "clover sick."

MR. FAVILLE — If we raised a large crop of clover every year and fed it back, would it hurt?

MR. MCKERROW — No, this will keep the store of fertility all right.

MR. BARNES — Is not this compost heap the proper place to deposit our ashes?

MR. MCKERROW — It might be a good thing to spread the ashes evenly through the compost heap, and at the same time put the plaster there. I believe it will make the potash in the ashes more available for plant food, but might be detrimental in some other way.

GOV. HOARD — You have to be careful of one thing. The alkali in the ashes will operate upon the organic matter the same as lime will. It will fire-

fang and burn it and it sends the ammonia off into the air.

SUP'T. MORRISON — I would not put ashes in the compost heap anyhow. I think it is better to spread upon the land.

MR. GOODRICH — Do you believe that to maintain the fertility of the soil a farmer must return as much to it as he takes off from it?

MR. MCKERROW — Yes, I do.

MR. GOODRICH — How can he sell anything off then?

MR. MCKERROW — He can sell in the form of stock and butter without taking much fertility. I have heard Mr. Goodrich say that he can put back all the fertility that was lost in a cow's butter in a year, with two bags of bran, and I think in all probability our neighbors in Minnesota and Dakota will be willing to sell us that two bags of bran.

MR. GOODRICH — Isn't it true that some goes off in the seas and rivers that never is returned?

MR. MCKERROW — It goes very slowly. I believe we can take something off and still return the fertility in that soil. Such plants as clover will reach down and get it out of the sub-soil, but I don't think we should lay it down as proper to take off what we don't put on.

MR. FAVILLE — The good Lord has made provisions for us in this matter. Every plant is gathering more or less of the ammonia that is in the atmosphere and depositing it in the soil. Now, do not understand the good Lord will do it all. We have got to do our part and then he will do the rest.

MR. MCKERROW — Doesn't that ammonia that is in the air come from the decomposition of available elements?

MR. FAVILLE — It is possible the good Lord made that arrangement, that isn't our part of the programme.

MR. ROBINSON — Won't it be better to plow under that coarse manure, shallow, than to put it into the compost heap?

MR. MCKERROW — I did not advise the building of the compost heap on general principles, but in case you could not get this coarse manure out from any cause I would. As to plowing under shallow, take it one season with another, I havn't had very good results doing it.

I prefer to put all manure on the surface, for I not only get the commercial value of the fertility, but it acts as a mulch, which helps to carry on this decomposition or breaking down of the elements in the soil, making them available for plant food.

A MEMBER — If this clay land is short of potash, is plaster of any benefit.

MR. MCKERROW — There is no land in this state, so far as I know, where there is no potash, but if there is, plaster probably would not help much. Plaster in the manure heap will always be beneficial.

QUESTION — Why doesn't cow manure heat?

GEO. MCKERROW — Because it contains a large per cent. of moisture. It will ferment some and mixed with horse manure will increase the heat, but not enough to injure it.

QUESTION — How can we prevent horse manure from fire fanging?

GEO. MCKERROW — By mixing it with cow manure. By keeping swine on it or keeping it too wet to heat strongly. A little heating does no harm, but is rather a benefit. The horse manure in the bottom of a gardener's hot beds, so prepared as to heat all that it can be made to is still very rich. The earth put upon it appears to absorb the volatile parts. The loss by heating in mixed manures in the compost heap is very

small, much less than from leaching, when it is thrown out under the eaves of the stable.

QUESTION — How much loss does bran sustain in manurial value from feeding?

GEO. MCKERROW — The loss varies considerably, but with dairy cows properly fed the net loss does not exceed 20 per cent., and if the urine is all saved by absorbents the loss is practically nothing, digestion adding more than is taken away.

QUESTION—When should manure be hauled?

GEO. MCKERROW—It is best to draw out manure as often as possible.

QUESTION — Should it be rotted or fresh?

GEO. MCKERROW — Manure is never worth more than when it is dropped. Keeping will not improve it and the sooner it is spread upon the ground the better.

QUESTION—What is the average daily or yearly value of manure made by domestic animals?

SUPT. MORRISON — One of the late bulletins of the Cornell University Experiment Station is devoted to "The Production and Care of Farm Manures," and it gives much valuable information on both these subjects. An experiment with eighteen Jersey and Holstein grade cows in milk is very interesting. Each cow consumed on an average eighty-three pounds of food, made up of the following ration: 114 pounds of hay, 893 pounds of silage, 189 pounds of beets and 154 pounds of a mixture made up of seventy pounds of wheat bran, fifty-four pounds of cotton-seed meal, eighteen pounds of corn meal and six pounds of malt sprouts.

The excretion from a ration thus made up was eighty-one pounds per cow, having a value for nitrogen of six cents per cow, two cents for phosphoric acid and two cents for potash.

In another experiment where the solid and liquid excrement were tested separately, it was found that the latter was very nearly equal in value with the solid, and excelled it in nitrogen and potash. In each case the manure from well-fed cows giving large messes of milk was nearly or quite ten cents per day.

In the experiment with horses the results are not complete, as the excrement was only saved while the horses were in the stable, excepting one Sunday, during the period when they were not at work on the University farm. Tested in this way, the horses gave thirty-two pounds of excrement, which contained about four cents worth of the fertilizing material. In two experiments the manure on Sunday was weighed and found to amount to fifty-six pounds per day.

On week days the horses were hard at work, and their liberal feed of hay and oats went largely to supply waste of muscle and nerve power. It is possible that the excrement voided on Sunday while resting was worth more per pound. If not, it would only amount to between six and seven cents per day. It is commonly supposed by farmers that horse manure is richer than that from cows. It heats more quickly, and is therefore more active; but the manure from milk cows equally well fed is richer than from horses at work. The horses were heavy grade draft horses, weighing about 1,400 pounds each. The average weight of the cows was 1,173 pounds.

Experiments with sheep showed an average value of manure of 1½ cents per head; but it was especially deficient

in potash, indicating that this material had been more largely used by the sheep in developing either growth or wool. The average weight of the sheep was about 142 pounds each, and the food consumed 5.3 pounds per day. It takes about eight such sheep to weigh as much as the average cow, and for the food consumed they yielded more value in manure. This was possibly due in part to the cows giving milk. Pigs well fed gave a value of little more than one-half cent per day, and on carbonaceous food—corn meal, it was not that. The pig undoubtedly converts more of what he eats into flesh than any other domestic animal.

As summing up the experiments Prof. Roberts, the very efficient director, gives the value per year of manure made by 1,000 weight of each animal as follows: Horses, $19.12; cows, $29.82; sheep, $38.55; hogs, $17.11. In all these estimates of value the basis is that on which commercial fertilizers containing nitrogen, phosphoric acid and potash can be bought in available form.

# PLOWING, CULTIVATION AND TILLAGE.

## By THOMAS CONVEY, Ridgeway, Wis.

The triple title given the subject I am to discuss, as it appears on the programme, might be very accurately represented by the single word tillage, as the latter includes preparing the ground and cultivation of crops.

Plowing is a bone of contention in our agricultural discussions, and while many of us are experts in plowing with our tongues out of season, comparatively few of us know whether our plows are in fit condition for the spring campaign until the ground is fit for plowing. A sharp plow will do better work and more of it with less labor on man or team. I would prefer two shares for each plow and then the work need not be delayed. Plowing to be well done must be in straight lands to avoid cutting and covering and taking a narrow furrow at times. In plowing such land as I cultivate, a black prairie loam, a 16 inch plow is none to large for a 2,800 lb. team, and then there is no occasion to crowd a team to do a good days work. In a single year in plowing with a narrow plow you may loose enough to pay for a new one.

### *I Prefer Fall Plowing*

for every purpose if it is done sufficiently early. If not I would prefer spring plowing; late fall plowing has never given me satisfactory results, and where I have plowed very late in the fall, especially where the ground was wet, it was injurious for several years. I have resorted to late fall plowing to kill cut worms and feel satisfied there is no merit in it, especially, the statement that where you plow late you turn up the worm to where the frost will kill it. Where you plow sufficiently early you turn under vegetation of all kinds, when the conditions are most favorable for its rapid decay. The vegetation is less woody and a sufficient amount of heat is present to promote active fermentation.

### *In Plowing under Clover*

I would prefer to pasture the second

crop, as plowing under a rank growth of clover late in the season rarely gives good results. Early fall plowing prevents some weeds from going to seed, promotes the germination of those seeds that have matured, causing the destruction by fall frosts, leaves the land in such condition that it will absorb more of the rain and snow-fall and the winter frosts cause a more perfect disintegration of the soil, leaving it in a condition in which it is more easily cultivated it has a greater capacity to retain the necessary amount of moisture, and is in the best possible condition to take up or impart fertility to the growing crop. Another advantage obtained by fall plowing is the ability to get our crops in so much earlier. For when the ground is fit the earlier we sow wheat, peas, barley and oats the better. In fact, it is exceptional for any of these crops to do well when sown late, and I would have no paitence with any one who would delay sowing when the ground was fit; late crops are more subject to blight and rust, also injury from insects, they make a greater growth of straw but it does not stand up so well, nor is the quality of the grain so good. The early crop may fail, but the late crop is almost sure to fail.

*The Advocates of Deep Plowing*

are not so numerous as they used to be, and people agree as to the folly of deep spring plowing. Experiments would tend to show that turning up much of the sub-soil, even in the fall at a single plowing, is pernicious. Some sub-soils are nearly barren, others only require a sufficient amount of exposure to the elements to render them fertile. This spring plowing rarely affords.

Deep plowing of sod is always objectionable for it places the vegetable matter so deep that the heat does not reach it to promote active fermentation, and it places the fertility too deep for the roots of crops.

The loosening up of the sub-soil when it is not placed on the surface may be beneficial with some soils and for certain crops.

*I do not Think*

land can be injured by being plowed when dry. And I am fully convinced that it receives permanent injury by being plowed when wet. Much mischief is done by driving over the ground when very moist, and cattle are allowed to roam over the fields, plowed or unplowed pasture or stubble, needlessly. I have often thought that where cattle are allowed to run in stalk-fields, the tramping did more harm than would the removal of the fodder, even were it never returned.

"As you sow, so shall you reap," is literally true in agriculture. Careless preparation of the soil rarely gives good returns, and while tillage may not be manure, it is the best substitute we know of. In animal husbandry, to get the best results we depend on a combination of breed and feed. So in agriculture, we depend on tillage and manure, and the tillage is indispensible in preparing the ground when manure is applied, as it should be well distributed in the surface soil. In the cultivation of my land I strive to secure a fine surface soil and a firm sub-soil, and when I spring plow, I harrow and pulverize until the ground is fine, level, and well compacted. In preparing fall plowing I would only strive to loosen up the surface to the depth at which I expected to plant.

*I Prefer to Drill*

in grain for various reasons. It takes less seed, it is more evenly distributed,

all being placed where it will grow if the grain is sound. The grain stands up better, ripens more uniformly and does not suffer so much from drought, or the extreme heat of midsummer; being sown deeper, it gives grain of a better quality and more of it.

Drilling has these disadvantages, however; it costs more, does less work in the same time, will put grain too deep if the soil is too loose, and the shovel drill is difficult to operate when cornstalks or stubble are on the ground. In spring plowing it is much better to harrow before the ground dries too much as loose ground will be very apt to do in a short time. Few farmers realize the advantages of perfect preparation of the soil and while it may be possible that land may receive too much cultivation or preparation, I have never seen any instance of it, but I have seen crops suffer from injudicious cultivation, by seeding too deep, a very common occurrence, by cultivating too deep, which occurs more frequently, and by neglect to cultivate at the proper time.

*The Main Objects*

to be attained in cultivation are, 1st, to loosen up and pulverize the soil that it may arrest and retain the necessary moisture; 2nd, to make the soil porous to promote the extension of the roots of plants; 3rd, to produce that firmness of soil that is indispensible if we expect the plant to take up the largest amount of fertility; 4th, recent experiments tend to show that the absorption and retention of solar heat depends not only on the color of the soil, but also on its more perfect pulverization, and the evenness of the surface; 5th, the destruction of weeds.

In those crops requiring summer cultivation we should not neglect to cultivate after each rain, as soon as the ground is sufficiently dry, to break up or check capillary action, and retain the moisture near the surface. Cultivation at this time is the most propitious to check the growth of weeds.

*Compacting the Soil*

by judicious cultivation, appears to be especially needed in promoting the perfect germination of seed, especially grass seed, and time spent in the preparation of ground hastens the growth of the crop. This is especially so of the corn crop, as careless preparation means slow growth, difficult cultivation, and meager returns. Many persons claim they cannot harrow corn after planting, simply because they do not give the ground proper cultivation before planting. Therefore they fail to avail themselves of one of the most perfect methods of weed destruction. I will here ask a question of this audience. How does the root pruning that results from deep cultivation promote plant growth? In conclusion I will say, in imitation of the language of a distinguished writer, we *must* cultivate, *we must cultivate.*

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*DISCUSSION.*

MR. MCKERROW — How would you set your plow to do the best work?.

MR. CONVEY — A plow in good order should always run level.

MR. GIBSON — Will the shallow plowing do in dry weather turning down clover?

MR. CONVEY — I don't plow less than four inches. and I would consider that about the right depth to plow down a sod.

MR. GOODRICH — Wouldn't land that is plowed in the fall wash worse in the spring?

MR. CONVEY — Not if it is sufficiently level or where it is kept in proper condition, that is sown to grass in 3 or 4 year rotation.

QUESTION — Would you turn up any sub-soil at all?

MR. CONVEY — I would be inclined to turn up very little, especially in spring plowing.

MR BURKMAN — I got hold of some land several years ago that would not grow more than ten bushels of wheat, or anything else to the acre. I couldn't seed it, I had not barn yard manure enough to cover it. In the fall I plowed it as I could, tried to make it two inches it would run to one inch; and as late in the fall as I dared I plowed it again, and that ground the next year raised thirty bushels of No. 1 wheat to the acre, and was seeded in the best order.

MR. CONVEY — Where land is kept in proper condition by judicious rotation of crops, and judicious manuring it may not be necessary to have deep plowing, but if your sub-soil is rich, and the land is run out, it may be necessary to plow deeper.

MR. ROBINSON — Were your lands clay or sandy?

MR. BURKMAN — It is clayey black soil.

MR. MCKERROW — I believe it is a good plan to run a heavy roller on the spring plowing rather than dragging. Dragging is preferable to rolling or planking on fresh plowing, dragging levels and pulverizes, rolling or planking merely firms. The more perfect the pulverization, the less a crop will suffer from drouth, it also leaves the land in best possible condition for the crop to take up the necessary fertility. This was the principal advantage attained by the old style of summer fallowing, another being the destruction of weeds, of course it would be better to roll and drag too. Very few, give land sufficient cultivation in preparing for seeding, then they are disappointed with the growth, especially in dry weather, which we are sure to have during some part of the season.

QUESTION — Why would grain drilled in, ripen any earlier than if sown broadcast?

MR. CONVEY — It does not ripen as early in my experience, it ripens more uniformly because it is all sown at a uniform depth.

MR. OLSEN — Why is it that dragging will make it more firm than rolling?

MR. CONVEY — It pulverizes the soil. I would recommend rolling in every instance with such a soil as I have, unless the ground would be too dry, then it would blow away.

QUESTION — Did you ever drag spring grain after it was up?

MR. CONVEY — I never have dragged spring grain, I have fall grain.

QUESTION — Do you plow deeper for corn than you do for any other grain?

MR. CONVEY — No, sir.

QUESTION — Do you drag corn after it is up?

MR. CONVEY — Sometimes I have, yes, I have also cultivated before it came up, and then dragged and consider it the best way to handle fall plowing.

SUPT. MORRISON — The most successful corn raisers that I am acquainted with plow their corn land in the fall, and in the preparation of the seed bed spare no labor, in fact the most of the tillage and cultivation is done prior to planting. At the proper temperature the planter is started. The moisture in the soil can be largely regulated by the tillage. The best crops of corn I have ever seen in Wisconsin, the seed was put in thoro-

ughly prepared soil the last half of May. Corn ground well prepared is more than half worked.

QUESTION — Do you prefer to turn sod over flat or turn it over edgewise in plowing?

MR. CONVEY — I prefer to turn it over flat or nearly so.

# PASTURES AND MEADOWS.

## By C. P. GOODRICH, Fort Atkinson, Wis.

***Pastures and Meadows***

Are of more value and importance to the farmers of Wisconsin, than are all her other lands combined. They cover many times more acres, bring the farmers more money with a less expenditure of labor to harvest or secure, and yet, as a rule, they receive very little care and attention. With the exercise of proper care and judgement, their product might be greatly increased, perhaps doubled. Every farmer should keep live stock enough to consume nearly, if not quite all the products of his farm. This he should do to maintain its fertility, so that after it has been occupied through one generation the next will not have to abandon it or starve.

Not more than one-third of a farm should be plowed and cultivated each year, the rest should be in pasture and meadow in the proportion to suit the needs of the stock.

***Some Parts of the Farm***

should be in permanent pasture for the reason that it is the only safe way to provide pasture every year, for occasionally we have a season that fresh seeding fails where we are practicing a rotation of crops on the whole farm. Most farms have some land that is not profitable to cultivate each year, it being too wet to insure a good crop, or so rolling that it washes badly and will in a few years become impoverished and gullied to such an extent as to be nearly worthless. In seeding for a permanent pasture I would advise sowing a variety of seeds. Red clover (unless the land is too wet), alsike clover, timothy, red-top and blue grass, and perhaps some others. The red clover would probably run out in two or three years, but would produce a good deal of feed at first. One object of sowing a variety of grasses is to give a variety of food to the stock, for it has been found that they crave a variety, and will thrive better when they can have it. Another object is that there will be kinds adapted to the different kinds of soil, so that after two or three years it will be seen that one kind of grass will predominate in one part of the field and another in another part, illustrating the law of the survival of the fittest. In this way the ground will be fully occupied and leave no places to be grown up to weeds.

***If the Seeding is Done***

the same year a grain crop is raised on the land, I would advise sowing clover in the spring with the grain, and the other seeds after harvesting, about the first of September. If no grain crop is to be raised, I would sow all in the spring, then it could be pastured in the last part of the season. Never let weeds take possession of your

pastures, they are unprofitable and injurious to dairy stock as affecting the flavor of the milk. If for any reason the grass dies out in places and weeds are coming in, sow on more grass seed. In seeding for permanent pastures I would sow on plenty of seed, one peck or more to an acre of all kinds together. Lands that have never been plowed, such as rolling prairie or where timber has been chopped off can be seeded by sowing on Alsike, timothy, blue grass and red-top seed early in the spring, and when the cattle are turped on they will tramp the seed into the ground and it will grow so that in a year or two there will be a good stand of grass.

*Sometimes it is Desirable*

to have permanent meadows on low, moist lands. They can be seeded in the same manner as permanent pastures, but the blue grass seed should be left out, as the grass is too short and ripens too early for hay. Such meadows should be top-dressed as often as every third year, with fine well rotted manure and well harrowed with a sharp toothed harrow early in the spring. In this way they can be kept up to a good state of productiveness, otherwise they will deteriorate each year, for no land can produce continually successive crops of hay without exhausting its fertility, unless it is replaced by manure. Clover may be an exception to this rule. On most soils it is beneficial to sow on plaster, salt and lime on both pastures and meadows. Pastures also should be occasionally top-dressed with manure, for it has been found that long continued pasturing, unless the stock are fed something besides what they get from the pasture, will slowly but surely reduce its fertility. In some of the dairy districts of the eastern states where lands have been pastured with cows for 50 or 75 years, especially where the cows have been yarded nights and no manure put on them, they have become so reduced that they will not carry half the stock they once would.

*In Some Instances*

they are over-grown with weeds and the grass has died out. They can be renovated now only by plowing up, manuring and re-seeding or perhaps by manuring, seeding and thoroughly harrowing. If the farm is all good tillable land suitable for corn and all kinds of grain, my way would be on most of the farm, to practice a three or four years rotation. First corn then some kind of small grain and seed with clover, then mow or pasture one or two years. It is well after the grain is taken off to sow some timothy seed, say two quarts to the acre, so that if the clover should kill out in the winter in spots you would be reasonably sure to have something to occupy the ground besides weeds. I would surely sow the timothy and perhaps alsike clover too if I intended to pasture or intended to keep it in a meadow more than one year. I would manure it well every time I pastured it.

*Stock Should Not Be Turned.*

on pastures early in the spring when the ground is soft and the grass small and feeble, for they will tread up the ground, injure the roots of the grass and bite it so closely that it never makes much growth. Grass must get a good start in the spring if we expect to get much from it during the summer. The stock also do much better to be kept from the pasture until the grass has got up enough to afford a good bite with some substance to it, so they can satisfy their hunger without working hard all day for it.

*In Some Parts of the State*

there are large tracts of wet marsh lands that are now nearly worthless, for the grass that grows on them is of such a poor quality that stock will not thrive on it in fact will not eat it unless compelled to by being prevented from feeding on good nutritious grass, thereby starving them to it. Such lands if of peaty formation, when pastured a few years become so trodden up as to become little better than mud holes during the wet season. On many such tracts of land by a judicious outlay of money in drainage, sometimes amounting to only a small sum per acre, they may be dried out so as to be very valuable either as pasture or meadow. If such land is pretty well dried out by draining, I would not advise breaking up and killing out all the native sod, for then the peat in a dry time will be so loose and light that it will be nearly impossible to get it seeded again to grass.

*It Would Be Much Better.*

to go over the ground with some implement that would cut the bogs and smooth it down and then sow on grass seed adapted to such land, such as redtop, alsike clover and perhaps timothy. By this means the marsh sod that is left undisturbed will serve to make the ground firm enough so that stock can travel on it without cutting it up, and the new seeding will be much more likely to live, as the surface of the ground will not dry out so badly when hot dry weather comes. Treated in this way the cultivated grasses and blue grass will gradually run out the marsh grass, and the tramping of the stock will make the ground firmer each year and the result will be a very valuable permanent pasture.

*A Top-Dressing of Manure*

once in three or four years will greatly benefit such a pasture as this, as well as upland pastures. Marsh meadows, in many instances can be greatly improved by a similar method of smoothing down and sowing on grass seed and not plowing them. But such meadows when once well fixed should never be pastured, for it will serve to bring in june grass and white clover, which are too short to produce much hay and will also tend to make the ground rough again.

*New Seeding of Any Kind*

should never be pastured much the first year, but should be allowed to get a good strong start. New clover seeding should not be pastured much in the fall, even if it does have a pretty good growth. It is better to have the grain stubble stand up so as to hold the snow as a protection to the clover, and also if a coating of ice comes on the ground, to let in air and prevent it from smothering out. If the stubble is tramped down flat by stock, such a coating of ice will be sure to kill the clover.

*In Conclusion*

I wish to urge again the importance of taking good care of pastures and meadows, of frequent top-dressing with manure, and above all of not allowing them to grow up to weeds. If you discover any places where the grass, for any cause has died out, sow on and harrow in more seed, because, besides losing the use of the ground, you will be growing weeds if you do not.

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*DISCUSSION.*

MR. FAVILLE — I want you to tell us how we are going to get manure to put on pastures every two or three years?

MR. GOODRICH — The fields that we cultivate, that we make hay upon, our meadows, the straw from our grain and the fertility that Mr. McKerrow told us about, coming from the fields of Minnesota and Dakota.

GOV. HOARD — Don't you find a little difficulty in top dressing pastures, from the ground becoming offensive to the cows?

MR. GOODRICH—We don't cover over the whole pasture at once, only 2 or 3 acres at a time, and that gives the grass a good chance to grow up, and after one or two rains they will come back to better grass than ever.

GOV. HOARD — I have observed where pastures were top dressed the end of October, then there is the whole winters snow and rain before you turn out and the pasture is very much less offensive to the cattle.

MR. GOODRICH — That theory is all right, but as Mr. Faville says "Where is the manure to come from in the fall, if we have been hauling out all through the spring and summer."

GOV. HOARD — But I have been considering that you are sensible enough to keep enough for top dressing.

MR. GOODRICH — I draw it out when I have time, winter or summer. If I have it in October I put it on in October.

MR. RICE — Suppose you had a peat bog, but it had been ditched and had become rotten or mellow, what is the best time to put it on that soil?

MR. GOODRICH — A good many years ago I helped to haul out some peat muck and it had some slight effect on the land but very little, If it is loose and light I think it would be better to take it in and mix it with the manure in the stable as an absorbent. There are some elements of fertility in straw as far as it goes. It is as good as mulch.

SUPT. MORRISON — It shades the land.

MR. CONVEY — Do you approve of the summer feeding with grain for the purpose of adding fertility to the soil?

MR. GOODRICH — I don't think I would do it for that purpose alone.

MR. CONVEY—Don't you think it adds largely to the fertility of the land?

MR. GOODRICH — It certainly does.

MR. CONVEY — Would you advise taking a hay crop off the pasture the first year in order to allow the land to be less subject to injury by the tramping of cattle, to make a better sod?

MR. GOODRICH—I would mow it the first year in order to get a stronger, better sod and the ground would be firmer. I certainly would not pasture it the first year.

MR. CONVEY—I think our pastures are damaged to a large extent by turning the cattle on them too early in the spring when the ground is soft, and also keeping them to late in the fall.

MR. MCKERROW — If you had a farm, all good tillable land, would you have any permanent pasture on it at all?

MR. GOODRICH— I would to make sure that I would have *some* pasture.

QUESTION—What would you use for cutting up these bogs?

MR. GOODRICH — I have seen used different implements. I have seen one that had teeth that were knives slanting back some slanting sidewise to the right and some to the left and when it was drawn over the bogs it worked them up pretty well. Then when the ground is just thawed out two or three inches you take a disk harrow. Then go over the ground with a common harrow, then with a heavy roller. It is considerable work but it is better than to plough the sod up.

MR. ROBINSON —On these marsh lands that are kind of tough the only way I could manage was with a bog hoe, or plow it.

MR. MCKERROW—Would you sow lime on limestone soil?

MR. GOODRICH — I wouldn't sow lime on soil that had enough lime in it.

MR. MCKERROW — I think the object of the lime is to supply it in the bones of the cattle.

QUESTION — In the bottom of our small lakes here we have a sort of marl which seems to be a sort of decomposed shell. Would that be beneficial to our land?

MR. GOODRICH — I never had any experience with it.

MR. CONVEY — I think there is always a deficiency of lime on low moist ground, and this marl is largely composed of lime.

GOV. HOARD — In Stockbridge, N. Y., it is a limestone country and those men have found that for meadow lands and for all kinds of purposes that a top dressing of lime is good. The lime in the soil is not yet in condition that it can be taken up by plants.

MR. GOODRICH — I know that to be a fact, I have seen it sowed right over a ledge where the lime rock was quarried out from which the lime was burned with good effect.

A MEMBER — I will say there is so much lime in this marl that it has been taken right out of the lake and used for cement.

A MEMBER — If you had a quantity of straw left in the spring that had not been worked into compost, would you prefer to put that on as top dressing or keep it until you could work it into compost in the barn.

MR. GOODRICH — I would haul it out on the pasture.

MR. MCKERROW—I have hauled out a good many of these old straw stacks onto the pasture lands, and have always been well satisfied with the returns. It is very useful as a mulch, and it keeps the stock from cropping that pasture too close and gives it a new lease of life, and also appears to give it a great deal more growth than the fertility in the straw would warrant in itself.

SUPT. MORRISON—Wouldn't you consider a man rather a poor farmer that had lots of straw stacks that had to be worked down that way?

MR. MCKERROW—We know of farms that we have bought just because they were left that way.

SUPT. MORRISON — They were sold under a foreclosure?

MR. MCKERROW — Yes, that is about it.

A MEMBER—I own a farm that had a lot of these straw stacks, but when I came to keep 400 or 500 sheep I didn't have to draw it out that way.

MR. ROBINSON—Can we get benefit from purely vegetable manure?

MR. GOODRICH—Yes.

MR. ROBINSON—Then why don't we get it from the muck from our marshes?

MR. GOODRICH—Perhaps you put on too much of it. It should be spread lightly and evenly after plowing.

MR. ROBINSON—I took it out of the marsh and thought I had a bonanza, but it didn't work very well.

GOV. HOARD—There is a vast difference between muck and peat. Peat comes out sour and cold.

MR. ROBINSON—We take off the peaty portion and underneath that there will be three feet perhaps of purely vegetable product.

GOV. HOARD—That is fine for manure if you handle it right.

I remember my father had a peat heap in the barn-yard, and his 25 or 30 pigs rooted it over and it was then spread upon gravel knolls and we found the clover was the very best on this gravel and on sand but it was worked over 3 or 4 times in the summer.

MR. MONRAD — When the peat has been treated in that way you have the very best absorbent for liquid manure that you can get. You have a bonanza indeed.

SUP'T. MORRISON — Two years ago I visited the great farm of Mr. J. J. Hill the railroad king of the northwest, and in passing through his large barns and stables I found small piles of this muck placed conveniently in different parts of the stable; I asked him what he used it for. He said, "We use this peat or muck entirely as an absorbant, and we find it the best with land plaster that we can possibly get." And I thought to myself "Here is this great railroad king with his millions, saving the liquid manure in his stables, and if we farmers in Wisconsin would be as particular in saving those leaks and wastes it would be millions in our pockets.

A MEMBER — About this mulching with straw, would you rather put it out into the pasture in the spring or leave it until the fall when you could draw it into your land and work it under.

MR. MCKERROW — I would take it to the pasture unless there should be some foul weed seeds in it. In that case I would compost it, rot it thoroughly unless straw was short and I wanted to save it for the next season.

MR. WILCOX — I think it would be a good plan to haul it out in the fall. It will keep the snow and the air from the plants.

MR. GREEN — Mr. Goodrich, how much alsike would you use with other seed.

MR. GOODRICH — If mixed as I described I would not put in more than three pounds. It is a very fine seed.

MR. GREEN — I have sowed one and two pounds to the acre with other grasses, and had a very thick crop.

MR. GOODRICH — I believe in seeding pretty well for permanent pasture.

A MEMBER — I sowed four pounds and had a heavy stand, just like the wool on a sheeps back.

MR. MCKERROW — We have sowed at the rate of two pounds and have a good thick stand. You must remember two quarts of alsike seed is about equal to four quarts of medium red clover.

The Institute adjourned.
To meet at 1:30 P. M.

# AFTERNOON SESSION—MARCH 17th.

The Institute met at 1:30 P. M. Sup't Morrison in the chair.

## CLOVER AND HAY MAKING.

By C. H. EVERETT, Beloit, Wis.

*Mr. President, Ladies and Gentlemen:* I am not here to tell you all that there is worth knowing about clover by any means, for the man who make such an assertion would be bold indeed, but I hope to say some things that will be worthy your thought and consideration, and perhaps I may suggest some method that may be worth your adoption. I shall talk from my own personal experience and observation with clover.

I have been obliged to make somewhat of a study of it in order to get the best results and with the most economy. I have studied and tried to understand the characteristics of clover as a fertilizer and first I will speak of clover as a fertilizer. Many farmers make a mistake in not sowing enough clover in the first place, and then they leave it down too long. They will seed perhaps half the farm to clover, and then will let it lie until it has run into other grasses which it will do in three or four years.

I have known men who have kept it six or seven years until it has run out of clover into red top and other grasses, and the excuse is that seed costs too much. They fail to realize that every dollar invested in clover seed will bring back five or six. It is wrong to leave clover longer than the second year.

If you seeded last spring you will get this summer a better quality of hay off that land than you will the year after.

You will cut that piece once or twice the same season, first and second cutting of hay or one hay crop and one seed crop, or hay crop and fall pasture as the case may be. The roots at that time have obtained their growth and as you all know, have gone to the lower stratum of soil after the fertility that is beyond the reach of ordinary vegetation, and if you plow under at that time you secure the plant food you are after.

I say, sow all the clover you can every spring. Don't let it lie until it runs out.

Land plaster is very valuable on all our soils when used in connection with clover. It is not in itself a fertilizer but it takes up the ammonia, and holds it in the soil as a plant food. Chemists tells us that all vegetable matter while decaying generates ammonia, and as that evaporates at eighty degrees, it goes back again into the soil by being condensed with moisture, then the land plaster takes it up and holds it for the soil. For years it has been a study to find out how plants obtained the nitrogen which is so valuable.

It has been decided lately by German chemists that in the little warts on

clover root which you have seen so many times there is a minute, living germ that takes the nitrogen from the air in the soil, and feeds it to the clover plant.

Of the amount of clover seed to sow and the methods, there are many different opinions, but my advice would be, you can get just as good results from four as you can from ten quarts if you use a little care in sowing it.

One quart of clover seed contains approximately 500,000 grains, and by a little further figuring, I have found that that evenly scattered over an acre of ground would give a little more than twelve plants to the square foot, and as seven plants is about the average, you will readily understand the folly of such heaving seeding. I think four or five quarts is a liberal amount where you are sowing for hay, and where I am sowing with small grain to protect the soil from the sun for fall seed, fertility, etc., I sow two or three quarts, and I would rather see the stubble fields in our state covered with a green verdure of clover than to have the hot sun pouring down into the soil cracking it open and letting out the moisture and the fertility. There is another advantage in having your fields seeded to clover. After harvest you can take your stock from the permanent pastures and turn them on the clover field and the permanent pastures will be much better the following spring for doing so.

*Clover Hay.*

I will speak next about clover hay which has a higher feeding value than any hay we can raise in this or any other state in the union, ton for ton. It is claimed that one ton of clover hay and a ton of barley straw mixed, is equal in feeding value to two tons of timothy hay. It comes nearer to being a balanced ration complete within itself, than anything else we feed. It has a manurial value of $9.00 to $10.00 a ton, based on the price of commercial fertilizers in the east, as they pay there 16 cts. a pound for nitrogen.

Stock raisers all know the value of clover in raising young animals, it contains so largely of those elements that go to make up animal growth. The dairyman knows the value of it. It is even good for the brood sow. I prefer it to all other hay for horses but we must use judgment in feeding it, or they will eat too much of it. We can raise clover cheaper than timothy. It stands drouth better on account of its long roots, it will yield from one-third to one-half more than timothy, and is a surer crop.

*Save The Best.*

The foliage of the clover plant is the most valuable part, and we must save that if we wish to get all the feeding value in the hay. In speaking of good clover hay, I do not mean the average quality to be found in this state. I don't mean that coarse mow-burned indigestible stuff that can be found in abundance.

Hay of any kind must be bright and clean, free from dust and possessed of the desired aroma. I know it is possible to make such hay.

SUPT. MORRISON — Suppose it rained every day in June?

MR. EVERETT — If we had nothing but an ordinary shower each day, I would have just about as good hay. There is, in my judgment, only one method of making hay, and by that method I get a certainty of success in quality each year, that cannot be said of any other method with which I am acquainted.

*Hay Caps.*

You all know that clover hay has got to sweat out somewhere. If it is allowed

to sweat in the stack or in the barn there is a loss of feeding value, it becomes discolored and dusty, oftentimes almost spoiled. I have found from experience, that the place to let that take place is in the field, and I have found to do that successfully, in all kinds of weather that hay caps are a necessity. I don't mean something that will cost 30 or 40 cts. each, but a simple hay cap made of cotton cloth. I buy that cotton cloth by the bolt, and the caps are made one yard square. I tear off a yard square and hem the two rough edges. I fasten those down on the hay by means of little weights at the corners of the caps and they keep in place all right. I used to use the pin but the hay would settle down, and in a hard wind the pins would work out.

I studied a long time to determine what I would use for weights. I went to the factory and found it would be too expensive to get them cast, then I wondered if I could fasten in pebbles weighing about four ounces, and the more I thought the surer I was that I could. So I fastened in a pebble to each corner of the cap by means of a little piece of the cloth. I tear up the cotton in squares just large enough to place the pebble in the cloth and tie around. Then I tie a strong piece of hemp string around it and to the corner of the hay cap. I know of such caps having been in use on a farm near Baraboo for 20 years and they are good to-day. When drawn over the hay in the field they are nearly water-proof. Such cloth when it is wet thickens up and it will turn water like canvass.

### *The Time to Cut.*

Now then, as to when to cut clover to make the best kind of hay. Many farmers wait too long, until the heads are turned borwn, because they say they can handle it easier. That is true, but the ease with which they handle it has been purchased at a price of ⅓ the value of the hay. I have found that by cutting off the clover plant as it began to head that the stalk was full of water, it was very rank, very green.

Then I waited until the head was out in full bloom and cut again, and I found at that stage of maturity that the stalk had commenced to get a little bit pithy; of course at that stage of maturity the honey or sugar is in the plant. Then I waited until the hay was turned brown and I found the stalk was getting hollow, woody; it was fast loosing its feeding value.

So I determined the best time is when it is in full bloom, and we go by that rule.

If you have fifteen acres of clover you will need 350 or 400 caps. If you have fifty acres you won't need more than a thousand.

To illustrate my methods, I will take 15 acres of clover hay, and handle it as if I were at home.

If I were ready to cut I would go out after the dew is off; never put up clover with any external moisture on it, and would cut down enough this morning to make 150 cocks of hay as nearly as we could guess at it; after dinner we cock it up, and put on the hay caps.

### *Making Hay.*

We take no chances on the weather, as soon as it is piled up it is covered. Tomorrow we repeat that operation, the next day the same, putting up each day about 150 cocks. On the morning of the fourth day, if we have had average hay weather, after cutting the usual amount of hay we remove the caps from the hay that was cut the first day. That hay has been through the sweating, and we open it to let it throw out the water

that is in it. In opening that hay up don't tear it all to pieces, and scatter it all over the ground. The hay has settled down, and we take it off in what I call flakes.

We put two rows of cocks into a winrow and in two or three hours of good weather that is perfectly made hay; you have all the moisture drawn out, and you have all the feeding value left in. It does not go through the sweating process a second time in your barn, and it comes out a good color, bright and sweet. Some years it takes longer to sweat out than others.

It is handled in flakes and it makes pretty work of it. The caps taken off this hay cut the first day, will be used on the hay cut the morning of the fourth day, and after that we draw every day, and add as much each day, so we are using 400 or 500 caps each day, but only handling 150 or 200.

Those caps may be used for other purposes. I use them in curing millet and in curing oats cut green for dairy cows.

I don't expect you all to adopt these caps, but I wish some of you best farmers would purchase cloth enough to make a few, and give it a good fair trial so you can determine for yourselves whether I am talking facts or not. I believe this method is practical because it means economy and good sense.

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*DISCUSSION.*

MR. MCKERROW — How deep do you sow clover seed to get a good catch in a dry season?

MR. EVERETT — We have a heavy clay soil. We sow clover seed with all small grains, and we always sow in the spring after the grain has been sown and harrowed. All the covering that clover requires is rolling in our soil. In your sandy soil I am told that clover has to be covered one-half to two inches deep.

MR. FAVILLE — Did you ever know of clover seed that failed to grow?

MR. EVERETT — I never saw clover seed that failed to germinate.

QUESTION — How expensive are those caps?

MR. EVERETT — They cost about six cents by the bolt. Unbleached cotton cloth.

MR. WILCOX — What brand do you use?

MR. EVERETT — It is what is known as "B. B." made at Janesville, Wis.

QUESTION — Do you advise pasturing the clover the first fall?

MR. EVERETT — I don't advise it unless you have a very heavy crop of clover. I would object to pasturing very close where I wanted to save it for hay the next year.

QUESTION — How many caps does it take to cover the hay of an acre of land?

MR. EVERETT — About 75 caps if you are raising three tons to the acre.

MR. WARREN — Do you consider alsike as good as medium clover?

MR. EVERETT — I do not. It is not as good a fertilizer. You can get but one crop of hay from it usually, though it makes good pasture, and makes a good soiling crop.

MR. FISHER — Can you make a first-class quality of clover hay from mammoth clover?

MR. EVERETT — It is coarser hay though it is good quality. It has full feeding value.

MR. CHANDLER — Will your hay caps blow off?

MR. EVERETT — They would blow off sometimes when I used the pins but

since I have used weights they will stand any kind of a wind.

QUESTION — Do you have any trouble raking this green hay?

MR. EVERETT — Not at all. I have to make smaller winrows. A one horse sulky rake will do it nicely. The only time the hay would mold by this method would be when we have 4 or 5 rainy days, then it will mold near the ground a little.

MR. FAVILLE — There is no trouble in raking, but the trouble is in pitching it. All of it that is under the winrow has not been stired by the rake and so sticks to the ground and it is difficult to get it up. This may be largely remedied by double raking I mean by that going twice over the same ground. In that way the hay is all stired and the winrow is left compact. Of course this makes double the work in raking but the time saved in pitching will very much more than pay for the extra raking. And I would add that double raking will be found to pay in any kind of hay as well as in clover.

QUESTION — When will you sow plaster to get the best results?

MR. EVERETT — I have always sowed early in the spring.

MR. GOODRICH — What makes clover hay dusty?

MR. EVERETT — Fermenting and heating in the mow.

QUESTION — In putting up your hay preparatory to covering it with caps, isn't there danger of getting too much?

MR. EVERETT — Yes, the piles should not be made too large. If made small and snug they will sweat out much quicker. I think the piles should contain about from 60 to 70 pounds of cured hay.

MR. MCKERROW — Would you be just as particular in cocking up this hay as if you were going to leave it uncovered?

MR. EVERETT — Just as careful.

QUESTION — Do you think you get as much feeding value out of clover hay, as you would by siloing the clover?

MR. EVERETT — Yes, I believe I get more. Prof. Henry told me at Madison that if it was practical to make hay by that process, he had got done trying to silo clover.

QUESTION — Will it hurt if the hay stays piled longer than you said?

MR. EVERETT — No, sir, sometimes it has to stay 7 or 8 days, and it takes no hurt except where it would weather-color around the outside.

QUESTION — Would you recommend putting salt in hay while you are putting it in the barn?

MR. EVERETT — No, sir, I think it would be an injury. I think it forms a brine and starts sweating, and heating. We used to think that we ought to salt hay to get the stock to eat it. If I had hay that the stock wouldn't eat without that I would sell it.

QUESTION — Do you take the pebbles out of the corners of the caps?

MR. EVERETT — No, just hang your caps up in the tool-house or somewhere, and be sure the mice and rats don't get at them.

QUESTION — Is the second crop worth more for hay than it is to plow under?

MR. EVERETT — Yes, I would prefer to make hay of it, then to make that hay into manure, and put the manure back, than to plow under. The clover root is a great fertilizer, and has a mechanical effect on the soil as well.

MR. MCKERROW — As I understand the clover roots act as a sub-soil plow. Do they do any good as a drainage plant, do you think?

MR. EVERETT — I think the decayed roots afford a chance for drainage.

MR. BURKMAN — Would you sow all clover for a pasture?

MR. EVERETT — We have a permanent pasture of 120 acres that never had a plow in it. I would not depend on clover alone for a pasture, I would sow a mixture of grasses, orchard and timothy, and blue grass, and all kinds for a pasture.

MR BURKMAN — Most of us cut a crop, perhaps, two crops, and then pasture, and then break up, a grain rotation, but we are using all the land for pasture as we come around with the rotation.

MR. EVERETT — In that case you perhaps would have to sow some timothy, but I would use as little of it as possible.

MR. WILCOX — What would you do with the second growth, the second year? Our practice is to plow it under usually.

MR. EVERETT — My practice is to cut it for hay if there is a sufficient amount of it. If it is going to be light we pasture it.

QUESTION — Do you think there is any benefit in ploughing under clover on clay soil?

MR. EVERETT — It has a mechanical influence perhaps, but I would prefer to pass it through the animal system, and put it back that way.

MR. MCKERROW — At what stage would you plow clover under to get the best results?

MR. EVERETT — In full bloom. I will say by our method of making hay we save all the foliage.

MR. ROBINSON — How do you keep up the fertility of your 120 acres?

MR. EVERETT — In that pasture are all kinds of grasses that grow in Wisconsin. There is high land and low land, June grass, red top and all kinds, and the fertility is kept up by the stock on the pasture. It has never been top dressed yet, and never been ploughed?

QUESTION — That could not be considered good land for rotation of crops?

MR. EVERETT — No, it could not be worked, part of the time some of it is a little low, and some of it is stumpy.

QUESTION — Do you get such rank growth of clover as to bother you when you harvest?

MR. EVERETT — We do some years, and it retards the work in drying the grain.

QUESTION — Is it profitable to keep a clover field more than one year.

MR. FAVILLE — No, for the reason that it is a biennial and when it has matured seed its life is gone. I have tried the different methods and have settled upon the plan of mowing only one season (two crops) and then plowing for corn. In this way (in ordinary seasons) we get a good crop of hay and have exhausted largely the life of the plant and it is at its best as a fertilizer and is very likely to die out the next winter.

QUESTION — Is it ever advisable to cut clover the first season after it is sown.

MR. FAVILLE — Yes, when the season is especially favorable for its growth some of it will get so far advanced that it will ripen its seed and that will die out but if the top is cut off it will prevent that and the plant will be saved and then again it is advisable to cut to prevent the weeds from maturing their seeds. The plan of doing this is to set the mower so it will run high and let what is cut fall as a mulch which will be found very beneficial to the young clover for the winter.

QUESTION — Is there any danger of land becoming cloversick?

ANSWER — there is much more dan-

ger of land becoming sick for the want of clover. I trust no one will be deterred from sowing liberally by any such idea.

Q — Do you believe worn out land can be brought to a high state of production, by the use of clover and land plaster?

A — I know it can from my own experience, but all the manure possible should be made and carefully taken care of; good manure applied to a clover sod that has previously had a dressing of plaster and plowed shallow, will yield heavy crops of corn.

Q — Will clover kill out snap-drag or Canada thistles and other noxious weeds?

A — I think not, but it will rid a farm largely of all common weeds. A well clovered farm is generally very free from weeds.

Q — Is it a good way to sow clover by mixing with the grain in the seeder?

A — While some farmers report good results by that method, I believe it is not good economy; it may do on a sandy soil, but on our heavier soil clover seed should not be covered deeper than one-half inch. I believe I can save seed and get better results one year with another to sow by hand, or with some of the machines made for that purpose.

Q — Do you fall plow clover sod for corn?

A — Very seldom. I have found it better to apply the manure during the fall and winter, and plow just before planting, turning under a heavy mat of clover.

Q — Is mammoth clover as good a fertilizer as the medium?

A — Perhaps it is just as good, but I would prefer the medium; the large clover grows a little heavier root, but will not stand as thick on the ground as the medium. I believe I can get more pounds of roots from an acre with medium.

Q — You spoke of curing millet and sowed corn, with hay caps. How do you do it?

A — Millet is very hard to cure. After cutting I let it lay for 24 hours, then put in small piles and cover with caps for about three days, then open to the sun for a few hours, then pile again, putting two piles into one, and cover for two days, when it is ready to stack and will be of extra quality. The corn is cut with reaper and left in gavels for a few hours, then bound, turning the top of the gavel to the center and set in shocks of 12 bundles and the caps put on, in a few days two of these shocks are put into one and the caps put back and left until cured.

Q — Has that sowed corn much feeding value?

A — Not very much for the dairy cow, but it is excellent feed for calves and affords a variety for the cow. I raise it, and millet also, on land after I have taken off a crop of clover.

Q — What is the cost per yard of the cloth from which the hay caps are made?

MR. EVERETT — The cloth costs me 6 cts. a yard.

Q — How wide is the cloth from which the caps are made?

MR. EVERETT — One yard, but if any one wished to go to the extra expense, cloth 1¼ yard wide would make a more desirable cap.

Q — Is it necessary to hem the edges of the caps to prevent them fraying out?

MR. EVERETT — Yes, it should be done.

Q — What will be the cost of the caps when they are all complete?

MR. EVERETT — I think one cent per cap will hem them and furnish strings, pebbles, etc. Making total cost 7 to 7½ cents per cap.

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# SCIENCE AND THE CLOVER PATCH.

By PROF. W. A. HENRY.

*Fertility.*

In a section like this, the subject of fertility is one of the very highest importance. To keep the land to a high state of fertility with barnyard manures is out of the question, because there is not enough of it. Commercial fertilizers are high priced, and beyond consideration where the crops sold from the land do not bring extraordinary prices. How, then, to keep up the fertility of our fields, is a most serious consideration. The value and importance of clover for this work calls for most careful consideration at our hands. Every farmer who has experimented with a field of clover, knows that when he has taken off a crop of hay, the land for some reason, is still in better heart than had no clover been grown. The condition is very different from that which prevails where a grain crop or even a corn crop is removed. In fact, there has always been a mystery about the clover plant which seems to bless the soil upon which it grows, though how and why has seemingly been beyond finding out.

*The First Experiment Station.*

Nearly half a century ago, John Lawes, an English manufacturer, became interested in agriculture, and established an experiment station out of his own private funds. One of the first problems taken up was a study of the clover plant. An investigation was made by the chemists of the station; Gilbert and Pugh discovered this fact, that in an ordinary clover crop, several hundred pounds of nitrogen was removed in the hay drawn away from the field, yet if the upper six inches of soil is analyzed before and after the crop is grown, there still is as much, if not more nitrogen in this upper layer than before the crop was removed. Where does this extra nitrogen come from, and how is it gathered? Their studies seemed to show that no nitrogen could be taken in by the leaves of the plant, though four-fifths of all the atmosphere is nitrogen. As a tentative conclusion, their results seem to indicate that the nitrogen must come from the sub-soil, and that the clover plant simply transferred it from deep in the soil to near the surface. This explanation was not at all satisfactory, and it was left to a German by the name of Helriegel who has made a most wonderful discovery. To be brief, it is this; that on the roots of the clover plant there are little knots or tubercles. In these are minute organisms,—living things, these microscopic creatures have the power of taking nitrogen from the air and turning it over to the clover which grows thereon, and these plants upon dying and decaying in the soil, leaves the nitrogen in available form for succeeding plants.

*Nitrogen in Clover.*

It would take too long for me to enter into the details of this patient student's

work, but it has all the fascination of a novel about it. He found that if clover seeds were planted in several different flower pots in sand from which every particle of vegetable matter had been burned or washed out, that the little clover plants springing up would grow for awhile, if watered with pure water, but that after a short time, they would die, seemingly for the want of nitrogen. If to these starving plants he added a little water in which soil taken from a clover field had been stirred, that this water, though looking pure, carried to the plant organisms, which attaching themselves to the roots, formed the tubercles, and from that time if the plants were watered even with pure water; they would start ahead and make an entirely satisfactory growth. He found these same tubercles with organisms within, on all of the leguminous or pod bearing plants, such as the clover, pea, bean, etc., but found none upon the roots of the cereals, oats, wheat, rye etc.

Nitrogen is one of the leading elements in the structure of the plant, and without it no plant growth is possible. Phosphorous and potash are also elements often lacking in the soil, but usually there is a large quantity of both these minerals there, only they are not always in the most useful or immediately available form.

Gardners and others who buy fertilizers, pay a price not less than sixteen cents per pound for nitrogen. Now the scientist has shown us that the leguminous plant, especially our common seed clover, if given the opportunity, will gather this nitrogen from the air and stir it up without charge, and at last we have an explanation of the beneficence of the wonderful clover plant. It has taken science a long time to find this much out, but time and patience has at last accomplished this great work.

*Sow Clover Seed.*

With renewed confidence, then, I come to you again to urge that you place large faith in the clover plant. Keep it growing upon your farms wherever possible, and make all the use you can of it, for even though you remove the crop, the roots and leaves which fall to the ground are rich in nitrogen. Grow just as much clover as possible, at all times sowing seed with every spring grain crop, even if the young plants must be plowed under in the fall. The first time you visit a clover field after this talk, I hope you will dig up a plant and observe the little knots upon the roots. Within these are living organisms, almost infinitely small, each of which is working to gather the expensive nitrogen from the air, and turn it into a nitrogen compound that the coming plant can use and so aid in keeping your fields fertile.



# GRAIN RAISING.

By HARRISON COLE, Waterloo, Wis.

There is no branch of farm industry that has occupied the time and attention of more men than that of grain raising. And when thought, intelligence, and right methods are brought to bear, it has been, and will continue to be, a profitable business. But when wrong methods have been adopted, it has proven the bane of those engaged in it.

*Quick Returns.*

The quick returns of exclusive grain raising have been so fascinating to many farmers, that from year to year they have continued to sell their farms by the bushel, until the transaction ceased to pay expenses, and in balancing up accounts, too often have had to put a mortgage on their once fertile acres. Young men may not be aware that forty years ago it was a common expression that the more fertile parts of Wisconsin were so rich in natural deposits that they would never need any manure, and it was not an uncommon thing for men to move their log stables, because they could easier do that than to move the pile of manure that had accumulated around them, and that the burning of straw stacks was of common occurrence. These wasteful practices, I am glad to say, have been mostly abandoned, yet there are but few farmers that husband their manurial resources as closely as its importance demands.

*The Farmer's Bank.*

Grain raisers should remember that fertility is the farmer's bank, and that in order to have their checks honored, they must make liberal deposits, and that the value of these deposits is not determined so much by their bulk or heft as by their quality, and in order to have them represent a gold value, a large share of the grain raised on the farm must be fed there in connection with good hay and the refuse of the grain crops. I know of no practical way of successful grain-raising disconnected with animal industry. In fact I am personally acquainted with farms that have had but few animals kept on them for the last forty years, that are selling less grain per acre than others that are keeping a large stock of animals, leaving the returns from the animals clear profit.

A farmer's wealth cannot be reckoned by the number of acres he tills. A few acres well tilled may yield a handsome profit, while a large acreage may, and often has, with indifferent tillage run the farmer in debt. A good many reckon their thoroughness by the amount of time they spent on a field; while this may be true to some extent, right methods intelligently applied are of more importance. When manure first began to be valued in my neighborhood, we were terribly afraid of evaporation, and as soon as possible after drawing out manure it was plowed under as deep as possible. The growth from this to surface applications was slow, yet we have arrived at the conclusion that it is better to keep the manure at or near the surface, and we get double the benefit from the same amount that we formerly did.

*Be Thorough.*

Often for the want of a little more thorough work in putting in, and caring for a crop, we have to content ourselves with half a crop; if we can double the crop, we often more than trebble the profit, the extra expense being but little. I presume there never was a farmer that did not some time have this fact forced home upon him.

*Poor Seed.*

The loss to this country from poor seed, can never be ascertained, but beyond doubt it is much more than the most of us realize. The difference between a bushel of seed corn that throws out a strong healthy sprout, and one that throws out a sickly sprout after water gathers around the germ, is at least ten dollars per bushel to the one planting it. I apprehend that the running out of small grain, that so many complain of, is largely due to imperfect seed. Grain that has heated is more or less impaired for seed. To avoid this we should let our grain for seed get thoroughly ripe, stack it in small stacks or put it on a scaffold when dry. The amount of injury it receives from machine threshing I am not prepared to say.

It is impossible to farm against seasonns. The rule that works satisfactorily one year, may be a total failure another year, owing to climatic conditions, which with our present knowledge, it is impossible to forecast.

*Rotation of Crops.*

Each farmer should formulate a rotation of crops which he thinks best suited to his soil, climate and circumstances, and keep a close eye on the most prosperous farmers in his neighborhood, to see if he cannot improve on his methods. Having adopted a rule that is suited to you, do not be too prone to censure those that do not agree with you. We have a great variety of soils, and the rule that works well on one soil, does not apply on another.

On my farm, which is a clay loam, I have adopted a four years' rotation as nearly as possible. First medium red clover, mown twice for hay. I then cover that with manure, and plant it to corn. If I wish to plant more corn next year, then I mow clover this year, I try and sow my oats next to my clover field, and manure the oat stubble and plant it. I like to spread manure on my next years' corn ground in the fall and early spring, and let it lay as long as I can and get my corn planted in season. I then put all my teams at work on my corn ground; if the clover has a good start, I like it all the better, turning it and the manure nicely under, and as soon as it dries off a little, I drag it down close up to the plows; this helps to retain the moisture.

Plant within three or four days after plowing, I have always planted in check rows, though I believe more corn can be raised in drills if it could be kept clean. I like to drag corn if it is reasonably dry, but in wet seasons I have known dragging to be a positive damage to it. I follow the corn with two or three crops of small grain, always sowing clover with my small grain, pasturing on my stubble fields (which I do not wish to mow the succeeding year), with sheep, and as they eat most kinds of weeds, it helps to keep said weeds in subjection; the clover also furnishes a couple of months of nice pasturage for my sheep, keeps the ground full of roots which prevent the soil washing and adds to its fertility. With wheat I have better success sowing it with a drill after the ground has been well prepared. But

with oats and barley I see but little difference between the seeder and drill.

If it does not rain soon after sowing grain, I like to roll it to bring it up evenly. Grain of all kinds that I do not wish for seed, I like to cut a little green.

*To Recapitulate.*

1st. To retain fertility is the first requisite to successful grain-raising.

2nd. It is impossible to retain the fertility of a farm not connected with animal industry.

3rd. The more grain we can profitably feed our animals, the better we feed the farm and the better the farm will feed us.

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# GRAIN RAISING.

GEORGE MCKERROW, Sussex, Wis.

*Experience.*

*Mr. President, Ladies and Gentlemen:* I shall talk to you a few minutes on this subject from my own experience, not because it is better or more extended than that of anybody else, but because I can talk from that standpoint more intelligently.

I was born and brought up on a Waukesha county farm of eighty acres pretty well covered with stones, brush and a mortgage, upon which my father succeeded in raising from five to seven bushels of wheat to the acre about the time that I began to take an interest in farming.

We found after some years that by changing the system and rotating with clover, keeping stock and feeding the land with manure, we got it into better condition so we could raise better crops.

I prefer to talk of grain raising in rotation. In the first place we want good rich soil, then give it good tillage, sow good seed, handle the crop well after it grows, and get as much money out of it as we can. I agree with Mr. Convey that early fall plowing upon our clay soils gives us the best grain crop. I have a theory that early fall plowing destroys weed seeds to a certain extent, also allows the soil to breathe more freely and the action of the elements, moisture frost and sunshine, causes more of the fertile elements in the soil to become soluble or available for plant food.

*A Good Seed Bed.*

In the spring of the year we strive to make a seed bed upon the surface about two inches in depth, rather less than more. The surface should be fine and level, then we are ready to sow the seed. We prefer to set our seeder teeth so that they slant back, that they may dig no deeper than the two inches that has been pulverized; we think we get our grain at a more even depth and it germinates more evenly. We follow the seeder with a fine smoothing harrow, and that with the roller unless this particular piece of ground is of a heavy clay nature which will cause it to run together after a storm.

Then we follow the rolling with a smoothing harrow again to leave it in a little more broken or rough condition. The advantages of rolling our land we think to be that it makes the soil more firm, and also causes the retention of more heat and moisture, and these two

elements are necessary to germinate the seed and give the crop a good start.

Those results have been observed by students of the experiment station in different parts of the state and proven by experiments at the station. Our rotation is clover, corn, and small grain. As we do not plant corn enough to use up all our clover sod, we have clover, oats, winter wheat and clover again. A dry season comes in and throws us out of this rotation sometimes, but we follow it as well as we can.

*Use Good Seed.*

Now, many farmers make the mistake of arguing this way: "I have some good grain that will bring a good price on the market; I will sell that. I have some poor shriveled grain that grew down on low ground. I will keep that for seed." It is a great mistake. It is a very true principal in both animal and vegetable growth that "Like begets like," and if we sow poor seed we may expect a poor crop. Again in selecting our seed, we should strive to select it from a field that has been uniform in both quality andquantity.

When we have this seed let us clean it thoroughly. I used to think when I was a boy, and my step-father kept us cleaning seed grain after it had been cleaned two or three times over, that he did this to keep us out of mischief, but I have concluded that he was right about this thorough cleaning.

*A Change of Seed, and Sowing Salt.*

I now believe that a change of seed grain is a good thing except seed corn. I have fooled away considerable money in trying to get some kind of seed corn that would make a better crop than the kind we already had, and I have not succeeded in getting any that does better than seed that has been grown here for years.

When our crop is sown we should try to encourage its growth all we can. We favor sowing salt upon our small grain from the action that it has upon the soil. It has been demonstrated that soil with salt sown on shows more moisture per acre than without the salt.

It is argued by scientists that salt breaks down the silica in the soil, and makes it fit for plant food. This silica is the element which gives stiffness in the straw, and firmness to the grain. When the country was new our grain crop would stand for days after it was ripe, but now, before it is ripe it turns white instead of yellow, the straw instead of being glassy is rough, and it krinkles down before it is ripe, and we find salt helps these troubles. We sow clover with nearly all our small grains except where they follow clover. We sometimes drag these pieces and we think it benefits them, but I believe that spring wheat and winter wheat are benefited more than any other kind of grain by being thus dragged.

It is certainly true on our heavy clay land. We first discovered the benefit of salt upon our soil by salting some patches of Canada thistles to kill them off. We found wherever the salt had been put on, the grain stood up with stiffer straw and longer heads. We thought at first the sheep had been attracted to those spots, and had deposited more manure, and so made the soil better, but we experimented on other places and found it was the salt that gave stiffness to the straw.

*Early Cutting.*

There is another place where we, as farmers, are apt to make a mistake, and that is at the time of harvesting. I believe in cutting our grain crop a little on the green side, when the kernel is in a thick doughy condition. At that time

we get more feeding value in the grain. and in the straw. and we have found during our dry seasons when hay was scarce, that there was some feeding value in straw. In cutting it early we must observe a few principles. We are nearly all cutting with the binder and we try to get ahead of the twine trust by making large bundles and tying them tight, but we cannot do that and get the best results. Make the bundles small and tie them loosely. We drop our bundles in winrows in the field when we are cutting in dry weather; we leave these bundles four or five hours, and put two men in the field in the afternoon to set them up. We put them up ten bundles in a row with two cap bundles on top, but if it promises to be dry weather right along we set twelve bundles in a row, and allow them to stand that night and the second day, and on the second afternoon we cap them with two from the end of the shock. If we cap right away we find the center is a little brown, and this will make a difference in the price on the market.

We have found in hauling in our grain, particularly in the barley crop, that it pays us to divide these shocks and allow them to dry for an hour or two; it prevents an undue sweating in the mow or stack, which should be avoided.

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*DISCUSSION.*

MR. FISHER — How much salt do you sow to the acre?

MR. MCKERROW — From 150 to 300 pounds, sowing it from the hind end of our lumber wagon which saves our muscle. Where we have sowed clover with our small grains we always sow plaster with our salt, fifty to seventy-five pounds of plaster with 150 pounds of salt per acre, and we sow the salt as soon after the grain sowing as we can.

MR. OLSON — You say you sow clover with you grain?

ANSWER — Yes, sir.

QUESTION — Do you believe in packing the surface?

MR. MCKERROW — Yes, the best piece of spring wheat I ever saw grown was where a flock of sheep had tramped all over a field after it was dry in the spring. That field of wheat raised thirty bushels to the acre.

MR. FAVILLE — How much do you sow to the acre?

MR. MCKERROW — When I sow wheat alone I sow about a bushel and three pecks to the acre. For several years I have been sowing for feed about ⅓ wheat and ⅔ oats. It makes good feed I sow about 2 bushels of this and 2½ of oats.

MR. CHANDLER — What time do you consider early for fall plowing?

MR. MCKERROW — August and the first half of September. It will do very well until September or even October if the ground is dry.

MR. CHANDLER — Won't the dragging after the grain is up kill the clover?

MR. MCKERROW — I said I only dragged where I did not sow clover.

MR. CONVEY — Does not cutting grain on the green side cause a deterioration of the seed?

MR. MCKERROW — I said it should be in the hard dough state. I believe there is substance enough in the stalk when this grain is put up properly to fill up those portions and bring them to their best condition. We get the most weight at that time. I don't want to cut it so green that it will shrivel up.

MR. BURKMAN — Must you not sow heavier when sowing broadcast then when sowing in drills?

MR. MCKERROW — I think that less seed will do with the drill.

MR. BURKMAN — This question of dragging small grain is entirely new to me. How much would you drag?

MR. MCKERROW — That will depend entirely upon the condition of the soil. If the soil is somewhat mellow so that the drag takes hold of it freely I would only drag once and I drag with a light smoothing harrow, not one that has large teeth If the ground is pretty hard we drag twice. I start in one corner of my field and go diagonally across it. Then cross over this way [illustrating] and when I get through I have been twice over it.

MR. EVERETT — On poor soil would you sow thick or thin?

MR. MCKERROW — I would sow a little thicker.

MR. WILCOX — I have been told since I came here that it was injurious to plow under clover. I tried it on a piece of old condemned land that had been unused for 30 years, sandy soil and found it of great benefit. I got 9 bushels of No. 1 winter wheat off the land.

MR. MCKERROW — I would prefer to have the clover made into manure with stock.

MR. OLSEN — In driving a team over your field don't you cover up the plants, and destroy them?

MR. MCKERROW — Not to any great extent. We use the roller twice in putting in the grain. I have a little gang plow and where the soil is pretty compact, after our spring and fall rains we run it over before seeding, then roll pressing it down and leaving it level and fine. We sow the grain and roll again. The soil being compact the team don't make much impression.

QUESTION — How many bushels of oats do you raise to the acre?

MR. MCKERROW — We have raised as high as eighty-six, and as low as — well, I won't tell you, for it's not small crops we are striving for.

MR. RICE — Did you say you would sow more seed on low lands than on high?

MR. MCKERROW — Not low land. Poor land, I said.

MR. RICE — I find on heavy soils I could seed very heavy, and I could keep it from getting down.

MR. FISHER — I have studied on that point. I keep my land in pretty poor condition, but I have always found that I could seed heavier and get a bigger crop.

MR. MCKERROW — I was talking about land that is all in fair condition. How heavy do you call heavy seeding?

MR. FISHER — I put on 2 bushels.

MR. MCKERROW — I agree with you there.

MR. FISHER — Have you ever sowed land plaster on grain with the idea of finding out whether it benefited your grain?

MR. MCKERROW — We have years ago, and we concluded it was of but little benefit to the grain. When we sow in combination with salt we find good results.

MR. FISHER — That is my experience too. I sow salt and plaster now every time I sow grain.

MR. WILCOX — About 10 years ago I had a piece of wheat and oats mixed, and it was looking decidedly yellow. I had heard them say plaster would show a big difference in the color in 5 or 6 days. I went to Berlin and bought some and as I was going away from home I told my son to watch that grain to see how long it took to change the

color. I came back in about a week and I found it looking remarkably well. I asked John how long it took before it got there, and he said 4 or 5 days.

MR. NICHOLS — With land in a good state of cultivation, what kind of oats will I sow to pay the best, and how many to the acre?

MR. MCKERROW — I have been a long time seeking for a kind of oats that would stand up well, and I found one kind — the English Prolific, but they ripened very late giving me only about 32 pounds to the bushel while my white Belgian weighed 40 pounds. I never found a good yielding oat that would stand up well, but I sow spring wheat with my oats and that helps to keep them up, and I think they dry out better in the shock.

MR. BURKMAN — Did you ever leave your clover, and sow it, and drag it in when you dragged your grain?

MR. MCKERROW — We have done that, but with clover we get the best satisfaction from sowing as early in the spring as we can, and covering it a moderate depth.

QUESTION — Have you ever rolled it after it was dry?

MR. MCKERROW — We have, but generally roll it now as part of the seeding operation following the smoothing harrow.

QUESTION — How much wheat do you sow with your oats.

MR. MCKERROW — We mix the oats, and when together on the granary floor about ⅓ wheat and ⅔ oats by measure. I have a neighbor who has sowed half, and half for the past twenty-five years, more or less and has separated them with a fanning mill.

QUESTION — What kind of spring fence my neighbor's field was full of them.

termed the Lost Nation or Judson in our county.

QUESTION — Would you expect to get a good crop from land that was deficient in lime?

MR. MCKERROW — Certainly not, if it was deficient to that extent that there was not soluble lime enough to make a good wheat stand.

MR. BURTON — How long have you used your three gang plow?

MR. MCKERROW — About twelve years. It was made at Harriston, Ont. We use it simply in place of the cultivator when the soil is very hard on the surface.

MR. BENTON — It is used on the lake shore. They plow two or three times.

SUPT. MORRISON — The plow Mr. McKerrow speaks of is an English plow. We have better manufactured in the United States.

MR. MCKERROW — I had the first one that was brought into our county.

QUESTION — Is salt a preventative of the ravages of chinch bugs?

MR. MCKERROW — We think down in our county that it helps considerably in keeping down the ravages of the bug. Last season our salt gave out before we got the whole field salted, and the bugs worked right up to the line where we sowed the salt and the oats were down, of course, while just over the line where we sowed the salt they stood up fairly well.

MR. ROBINSON — Don't you think the clover helps that too?

MR. MCKERROW — Probably in some seasons. Still I don't think it is a cure-all.

MR. WILCOX — Eight years ago last summer I had a field of wheat sowed heavily with clover, and there were no bugs in the field, while right over the wheat do you sow.

MR. MCKERROW — It is gener lly

MR. FISHER — Isn't it your experience that grain is shorter where you sow salt.

MR. MCKERROW — Where it is salted it stands up the highest with us.

MR. FISHER — I have always found it shorter. I have always considered that salt was a detriment to the growth of the stem and the leaf, but it was a benefit to the seed and the kernel.

QUESTION—How can you prevent smut on wheat?

PROF. GOFF — Two distinct species of smut attack wheat. In the "black smut," the entire head is changed to a black dust. In the "stinking smut" or "bunt," the smut is inside the kernel.

In order to have a crop of wheat free from smut, both the soil and the seed must be free from smut spores. Wheat should not therefore follow a smutted crop of wheat for one, or better for two or three years, and manure from the straw from a smutted wheat field or from stock fed on smutted straw or grain should not be used on land intended for wheat. Seed wheat known to be free from smut may be safely used without treatment; otherwise the seed should be treated before sowing.

For the treatment, dissolve ten (10) pounds of sulphate of copper, also known as blue vitrol and blue stone, in eight (8) gallons of water placed in a tub of convenient size. As this substance dissolves rather slowly, it is well to add it to the water the day before it is desired for use. Pour as much of the seed wheat into the solution as the liquid is able to cover readily, and stir until every kernel has become thoroughly wet. Whatever rises to the surface should be skimmed off. Then pour off the solution into a second tub, and spread the wheat on a floor to dry. More grain may then be added to the solution, and the process repeated until all has been treated. The grain should not be permitted to remain in the solution longer than five minutes.

It has been found that the treatment here described injures to some extent the germinating power of the seed, and experiments have shown that if wheat thus treated is afterward immersed for a short time in lime water, this damage is largely averted. It is recommended, therefore, that all wheat treated to the solution of blue vitrol be sprinkled with air slacked lime as it is removed from the liquid, and then shoveled over sufficiently to thoroughly coat each kernel with the lime dust. This will prepare the grain for sowing without much further drying. If the slacked lime is not at hand, land plaster or road dust will hasten the drying equally well.

As the wheat will swell somewhat in consequence of being wet, the amount sown per acre should be slightly increased.



# NOXIOUS WEEDS.

By W. H. COLE, Waterloo, Wis.

*Mr. Chairman, Ladies and Gentlemen:* There is no subject more worthy the attention of farmers than that of noxious weeds, and few of us have given the subject the study we should.

The time is not far distant when we are going to spend more time to raise a partial crop, than it will take now to clean out those weeds from our state if we will make united effort in that direction. I have visited some parts of this state where the coming crop is going to be half Canada thistles, and the land is selling for $10 to $20 an acre less than if those weeds were not there. Unless we wake up to the necessities of the case, our state is going to be run over with them.

*The Burdock.*

The first weed I shall speak of will be the burdock. I find the general idea seems to be that the best time to cut the burdock is after the blossom is out This comes at a busy time, and the weed is generally very imperfectly cut, and they immediately propagate themselves. I have come to the conclusion that the best time to cut a burdock is the first time you see it.

*The Cockle-Burr.*

I next bring up for your consideration the cockle-burr, showing sample. This weed is not as bad as some others, and does not grow in many places, but it is better to know what it is, and declare war against it.

*Velvet Leaf or Stamp Weed.*

The next I speak of, many of you are not acquainted with yet, and yet it is creeping into our state, and the man who gets five acres of it seeded into his land will never live long enough to be rid of it. The seed has been known to live in the ground 25 years. It is the velvet leaf or stamp weed and there is no way of getting rid of it except pulling it out. The seed is heavy, does not blow around like the Canada thistle, but will lay in the ground and not come up till it strikes favorable circumstances. It appears about the first of June, and grows very rapidly and very high and throws out branches, and fills your ground full of seed.

The next is snap-dragon, or toad flax, and the sow thistle, weeds that propagate themselves from the root and seed. Get rid of them.

The same remedy that will rid your farm of Canada thistles, will also kill the snap-dragon and sow thistles, and as I shall give the best remedy I know of for killing the Canada thistles, you can apply the same rule to these pests.

*Canada Thistle.*

Next is the worst weed, all things considered, that we have to deal with for the reason that it spreads itself over our country so easily. There is a mistaken idea that Canada thistles don't take kindly to the soil.

I had a patch that I worked with, and didn't know how to get rid of, but I worked at them and made some stir, and the result was I was appointed thistle commissioner. I objected on the ground that I didn't know what to do with my own. I wished them to appoint a man who had had experience. They said "You make up in enthusiasm what you lack in knowledge; we will keep you right there." I took samples of this

weed and went around over the country and wherever I went I showed them to the boys, and the old men, and to everyone, and the result was I found thirty patches in our town, and there was not one in ten of those men knew he had the Canada thistle in town, and one patch covered some nine or ten acres. I found that every one had his own remedy. One thought to salt them, another to mow them off, another to put brine on and so on. I let each one do as he wanted but insisted on their being thorough in their work. If you will keep right after them, cut them down and burn them, then watch for the young sprouts and do it again, you will finally gain an advantage. A man who had had a patch of ten acres of them and had cleared them out this way told me he considered his farm worth $1,000 more than it was before they had been removed.

*Death to the Thistles.*

If I had a patch of Canada thistles, I would turn it into a pasture and salt my stock on that lot at least twice a week and I would cut off at or below the surface what I didn't salt. If I could not turn it into pasture, I would have a sharp plow, and plow it, and drag it thoroughly after it was ploughed with a fine tooth drag. Then the first thistle you see come up, put your plow in there and plow it up. Don't let them get up, they are carrying vitality back to the root and you are losing all that you have gained. If you will follow this up thoroughly you may kill them out in a year, and are very sure to in two years. You will have to keep that part of the field separate from the rest, and keep right after those thistles. I dug mine out twice a week with a spade. In the fall of the year the weeds come up thick, and for fear I might miss some I put the plow in and ploughed it up again and killed them the first year. Kerosene will kill them, and salt in a wet time will kill them. Brine will kill them.

*Appoint a Weed Commissioner.*

I wish every town that is represented here would see to it next spring, that there is a thistle commissioner appointed in that town and get the man who has got the most gimp in him. If possible get a man who doesn't want and never expects to hold any other office. Then stand by him and demand that the law shall be thoroughly enforced, and if you succeed in keeping these Canada thistles outside of the state, your children will never have occasion to thank you more heartily for anything than for that one act.

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*DISCUSSION.*

QUESTION — How deep do you cut the burdock?

MR. COLE — Two or three inches below the crown. There will be a dozen more ready to come up but it will kill that one.

MR. CHANDLER — What is the differance between the snap-dragon and the yellow-dock?

MR. COLE — Yellow-dock resembles a beet in leaf and seed, snap-dragon has a down in connection with its seed. Prof. Henry says that like Canada thistles the only way is to pull it up or to cut it off.

MR. THOMPSON — Isn't it easier to kill burdocks the second year than the first?

MR. COLE — When they first come up they only run down two or three inches and then is the easiest time to get rid of them.

QUESTION — Describe sow-thistle.

MR. COLE—I supposed that I knew what sow-thistle was, but Prof. Henry says that it propagates itself from the root the same as the Canada thistle. It belongs to the milk-weed family. The seed blows over the country, so if you find something of the milk-weed family that propagates itself from the root you may call it the sow-thistle.

MR. HYATT—Isn't there a difference in soil in regard to killing out Canada thistles, by mowing them?

MR. COLE—We find that a gravelly loam is the hardest place to kill them out. We also find that in the ground next to a marsh we kill them easily.

MR. FAVILLE—Will not burdock grow when cut off below the crown?

MR. COLE—No, but in loose rich ground the crown forms several inches below the top of the ground, and unless it is cut off below the crown, it will grow.

PROF. GOFF—I am glad this subject has come up, for it is a very important one to Wisconsin farmers. Almost all of our noxious weeds have come to us from foreign countries, and many that have invaded, and we may almost say conquered, the older states of the east are just coming to us in their westward march. By taking the proper stand, and maintaining a vigorous fight against these pests, we may keep them from our farms for a long time if not indefinitely.

*The Cocklebur.*

I wish to call attention to some of the weeds that seem to be just gaining a foothold in our state. One of these is the cocklebur of which Mr. Cole has just spoken. I think Mr. Cole speaks of this too lightly. In Illinois it is regarded as their most serious weed. Two years ago in September, while visiting in Champaign county, Ill., I saw men going through the stubble fields and even the corn fields, and carefully cutting out every cocklebur. When it is remembered that the farmers of that state do not think it necessary to hoe their corn, we may be sure that they must regard a weed as pretty serious that compels them to go through their cornfields and cut it out in September.

*The Sow Thistle.*

The sow thistle is a more serious pest than many suppose. In the summer of 1890, I visited the farm of Ex-Senator Lochen, near West Bend, Washington county, and an examination of some of his fields convinced me that the advent of this weed into our state is a serious calamity. Mr. Lochen is satisfied that it is a worse pest than the Canada thistle, and I am by no means sure that it is not. More recently I was shown a small patch of this weed in the garden of Rev. J. P. Roe, of Oshkosh, and I advised him to dig out every root of it, if it cost him $100.

I will add that there is an annual species of sow thistle that is not to be feared, as it does not propagate from the root. There is also a species of wild lettuce that many have mistaken for the sow thistle, and which bears a rather close resemblance to it in its general appearance. When you see a plant that you suspect may be the sow thistle, dig it up and examine the root. If you find it sending out little white underground stems, about as thick as a wheat straw, the plant had better be taken care of at once.

*The Quack Grass.*

The quack grass, or couch grass, *Agropyrum repens* is another serious pest that is silently creeping into our farms. It is to be placed in the same category with the sow thistle, Canada thistle and snap dragon, so far as treat-

ment is concerned. Mr. Cole's remedy is all right if persistently followed, and no remedy followed in any other way is worth a farthing. Another weed that we should look out for is

*The Wild Mustard,*

or charlock, *Brassica arvensis.* This is the bright yellow flowered weed that is so often seen in oats and barley fields in June. It is nuisance because it not only robs the soil of moisture and fertility, but the seeds, which are often threshed with the grain, give the latter an unclean appearance. It is easily cleaned out of the field by pulling the plants while in blossom, and when once the field is freed from it, no grain containing mustard seed should be used for sowing.

*Corn Cockle.*

While speaking of the mustard, it will be well to mention the corn cockle, *Lychnis Githago.* It is this weed of which the seeds form the cockle so often found in wheat, and which injures the quality of the flour when present in much quantity. I speak of it here because I infer from the number of samples that have recently been sent to our station for name, that it is just invading some parts of our state. It should be treated like mustard. Its flowers though very showy, are less conspicuous than those of the latter plant, since they do not appear above the grain.

*Pitchforks.*

The beggar's ticks or pitchforks, *Bidens frondosa,* should be fought, for though it is already with us, and has undoubtedly come to stay, its forked seeds, which attach so readily to the clothing and the hair of animals, make it an intolerable nuisance. It is an annual plant, and if not allowed to seed, cannot perpetuate itself.

The beautiful oxeye daisy *Chrysanthemum Leucanthemum* is a plant that it seems almost a shame to place in the category of noxious weeds, and yet its prevalence in upland meadows and pastures often makes it a serious pest. It is a perennial, and so is not very easily eradicated without breaking up the soil. It quickly succumbs, however, to clean culture with hoed crops.

One more hint, and I am done. All farmers do not understand the value of a very wet soil as an opportunity for killing weeds. In a rainy period, while the soil is saturated with water, many deep rooting weeds may readily be pulled out by the roots, that in a drier time would break off just below the surface. I have seen a thick patch of wild carrot and wild parsnip cleaned out in this way that had resisted all other methods. I would recommend trying this for all deep rooting weeds, and especially for those that are not readily conquered in other ways.

To aid in identifying some of our most serious noxious weeds, illustrations are presented on the following pages.



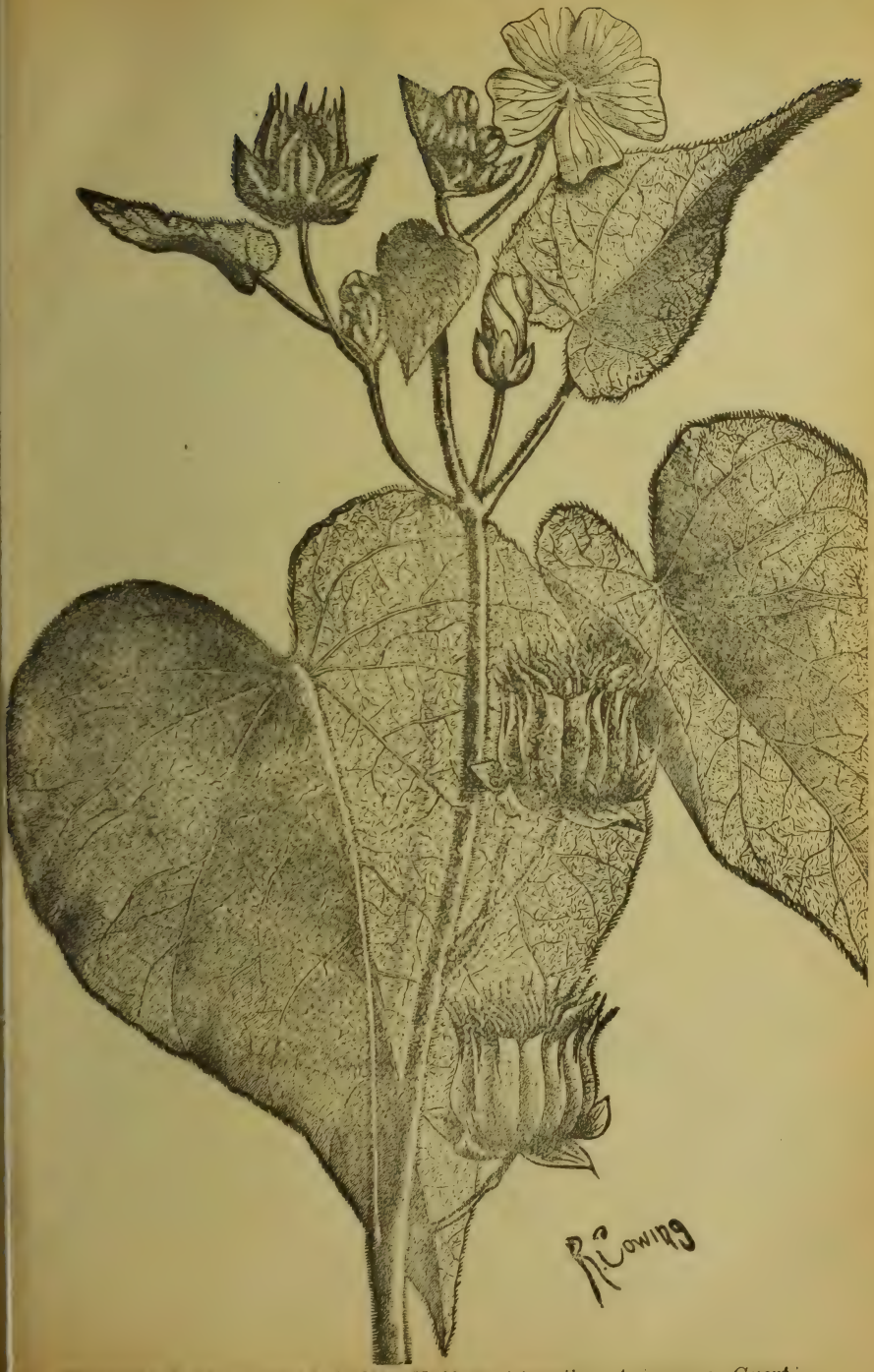
**Oxeye Daisy.**
(*Leucanthemum vulgare.*)



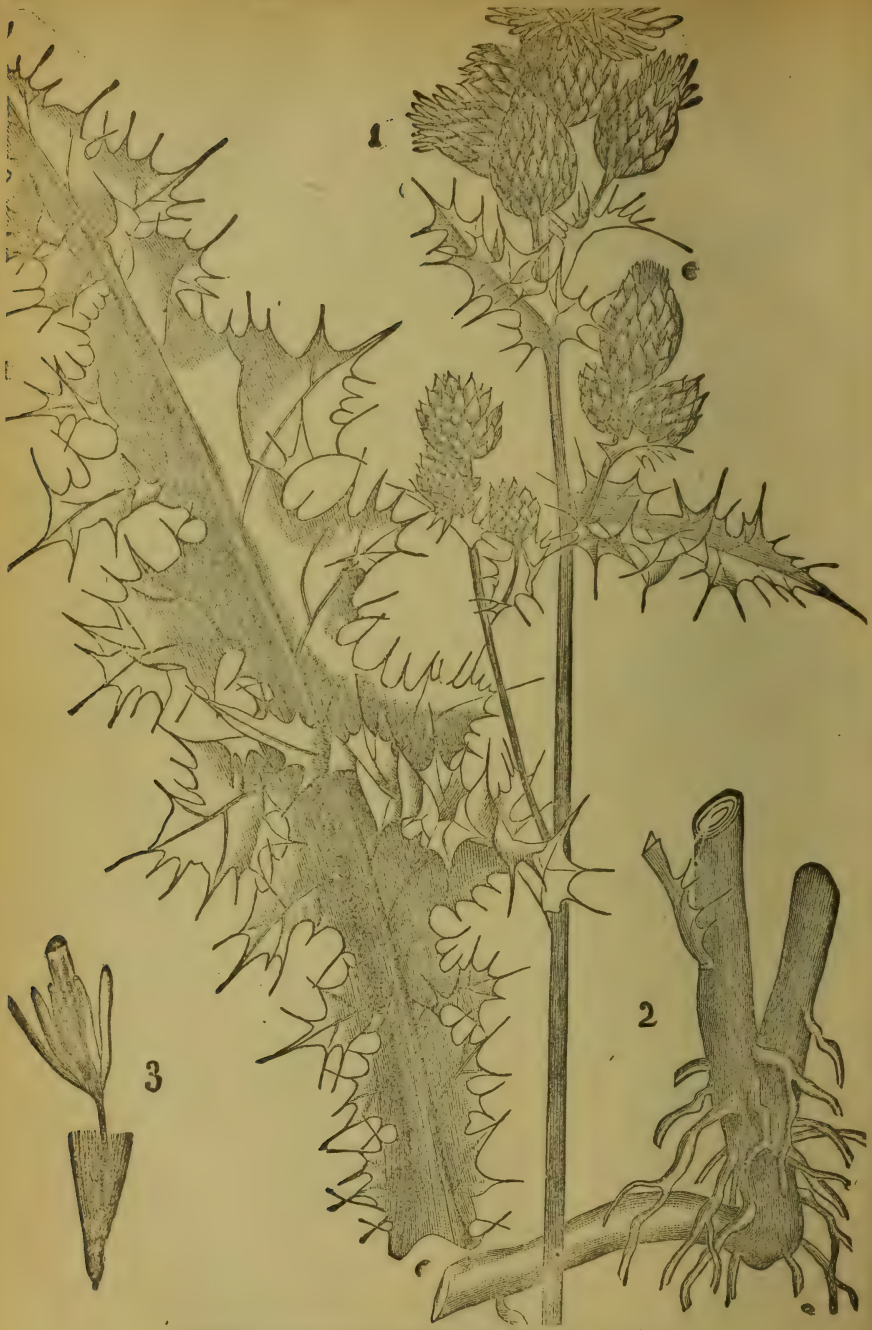

**Burdock.** (*Arctium Lappa*, L.)




Cockle Bur, Clot Bur. (*Xanthium* [illegible])



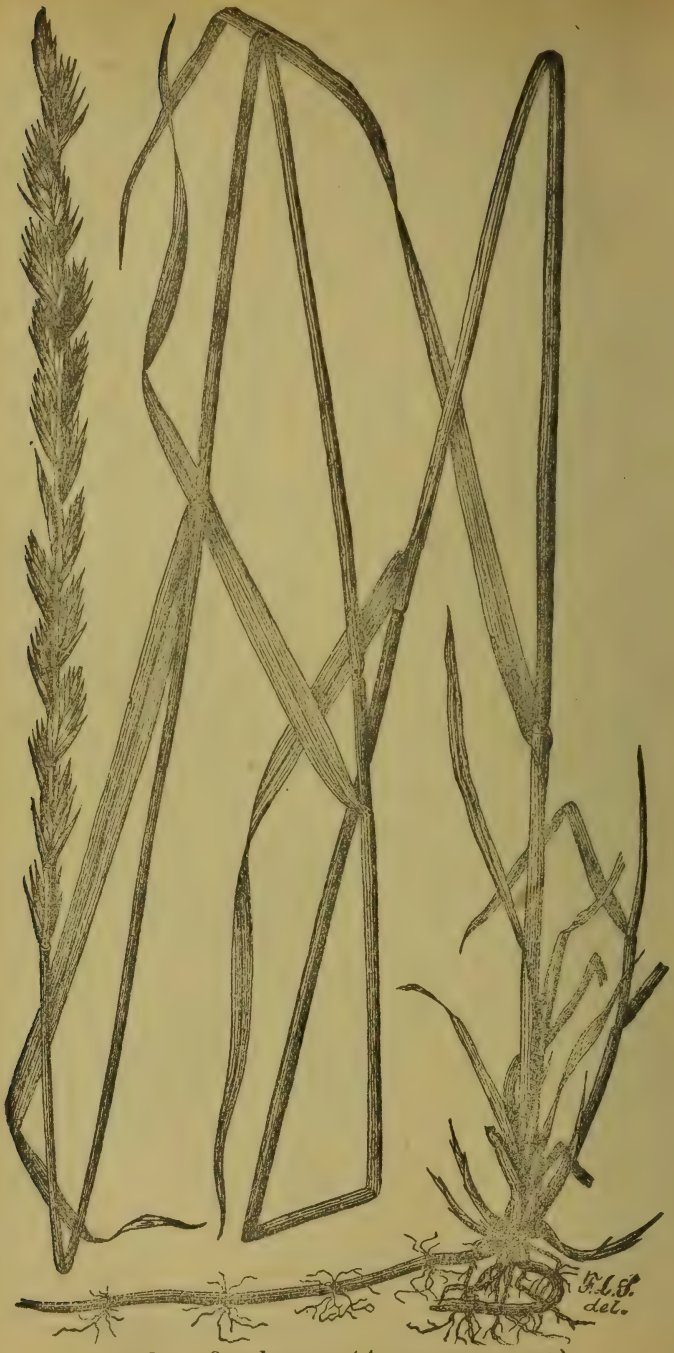
**Velvet-leaf, Stump-weed, Indian Mallow.** (*Abutilon Avicennae, Gaert.,*




Canada Thistle. (*Cincus Arvensis* (*L*), *Hoffm.*)



Sow Thistle, (*Sonchus Oleraceus, L.*)




**Couch or Quack-grass, (*Agropyrum repeus.*)**



Charlock, or Yellow Mustard, (*Brassica Arvensis* (*L.*) *B. S. P.*)




...ckle, or Corn Cockle, (*Lychnis Githago* (*L*), *Lam.*



Beggar's-ticks, Pitchforks, (*Bidens Frondosa. L.*)




**Toad Flax or Snap-dragon, (*Linaria Vulgaris.*)**

## EVENING SESSION—MARCH 17th.

The Institute met at 7:30 P. M. Sup't Morrison in the chair.

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# THE FARMER'S FOURTH-ACRE FRUIT GARDEN.

By M. A. THAYER, Sparta, Wis.,

*President of Wisconsin State Horticultural Society.*

If the farmers of Wisconsin fully appreciated the great advantage of a fruit garden, few would be without one.

You can get from it, more health, more comfort, more inspiration and more dollars for the same labor than from any other portion of the farm.

A farmer's home, with house plants in the window, flowers on the lawn, and a succession of small fruits, from a garden planned, planted, pruned and protected with aid of wife and children, giving each child control of a particular plant, bush or row, will do more to make children love the old homestead and keep the boys on the farm, than all the precepts ever taught them.

Horticulture is an important department of Agriculture, and its study and practice will certainly stimulate the farmer to better tillage, larger crops, finer stock and greater success in every way.

Now I have not come here to introduce some new, untried, high priced novelty. I am not here to sell plants of any kind, neither have I come to ask any considerable portion of your best land or very much of your time. I simply ask your attention to one little ¼ acre of land, and propose to illustrate how any person with ordinary intelligence can have fresh fruit, for the family or market, throughout the season, and produce thirty bushels on this ¼ acre.

### *The Fruit Garden.*

Now I want to select this ¼ acre on your farm, near your house, where your wife and children can look after it.

It is your garden, now be generous and let us have a good piece.

I want it four rods wide and ten rods long, nearly level and well drained.

If you raised corn or potatoes on this piece last year, and it was rich, there is little to do to prepare it for planting, but if a part of an old meadow or pasture and all run down we have work to do.

First put on a heavy coat of well rotted manure, plow very shallow and cut the sod fine with a disk or acme harrow, then plow again deeply, manure as before and harrow until fine and mellow.

For several weeks we have, of course been studying the varieties we want and those that are hardy and do well in our vicinity.

We also want thirty bushels of fruit coming in succession throughout the season.

This may be easily produced by adhering to the directions and illustrations of *The Farmer's Fruit Garden.*




Our garden being 66 feed wide and 165 feet long and wishing to do all labor possible with a horse and cultivator, we stake off the ground in rows one hundred and fifty feet long and seven feet apart.

Strawberry rows to be one-half this distance, leave a head land 7½ feet wide at each end for turning. Make the first row three feet from the outside and set as follows:

| | Production. |
|---|---|
| 1st Row 13 Plums and Crab Apples —5 Desoto, 2 Cheney, 3 Transcendent 3 Hyslop | 5 bushels |
| 2d Row—50 Blackberries—40 Ancient Briton, 10 Snyder | 3 bushels |
| 3d Row—50 Black raspberries —40 Ohio, 10 Gregg | 2 bushels |
| 4th Row—50 Red Raspberries, 25 Marlboro, 25 Cuthbert | 2 bushels |
| 5th Row—50 Currants—25 Victoria, 25 Red Dutch | 4 bushels |
| 6th Row—50 Currants and Gooseberries—25 White Grape Currant, 15 Downing, 10 Houghton | 5 bushels |
| 7th 8th and 9th Row—300 Strawberries—Warfield No. 2, Jessie, Crescent, Wilson | 5 bushels |
| 10th Row—17 Grapes—3 Moore's Early, 6 Worden, 5 Delaware, 3 Concord | 4 bushels |
| Total | 30 bushels |

These suggestions are based on practical experience in growing 40 acres of small fruit, 25 acres of same in blackberries and raspberries.

I have a love for the work and will without charge, cheerfully send an illustration of this garden with full instructions for growing small fruits to any person on receipt of name and address.

First in season comes the strawberry. The strawberry grows in every climate, on all kinds of soil, and with most any kind of treatment, but best results can be obtained only by good fertilization and high culture.

The ground should be covered with barn-yard manure, well plowed in and top dressed with rotted manure. This should be thoroughly mixed with the top soil by harrow or drag. Thorough

preparation will save much labor in caring for plants, and greatly increase the crop.

Use a line to get rows straight, and a spade or trowel for making holes.

Plants should be prepared for setting by trimming off old leaves and runers, straightening out roots and cuting back to four or five inches in length.

The roots should never be dry or exposed to the sun and wind, and should be set out as soon as possible.

*Setting.*

One man with spade or trowel, insert it to the depth of five or six inches, push forward while a boy takes plant and with fingers spreads roots out fan shape, and inserts same in hole, holding until the spade is withdrawn and dirt packed securely around plant with foot.

Care must be taken to have roots well spread, the earth firm around them, and just even with crown of plant, neither too deep nor too shallow.

If the season is dry, cultivate or rake over the ground at once, and wet or dry, every week during the season.

Weeds must not be allowed to grow. Frequent cultivation keeps the ground moist and mellow.

Permit no fruit to grow first season; pick off all buds and blossons.

First runners should be cut off; later ones allowed to grow and trained to form a matted row, with clean paths between.

When ground is frozen in the fall cover lightly with clean straw, marsh hay or coarse manure, and in the spring rake between the rows to hold moisture and keep the berries clean.

All plants are either staminate or pistileate (male or female), and pistileate varieties should have staminate planted with them about every third row.

Many fail to raise good crops because they do not understand this law.

Strawberry beds should be renewed every two or three years.

To do this in our garden, we will set only two-thirds of the bed this year and plant the balance to potatoes, next year the potato ground will be set to strawberries, with plants from your own grounds.

After second year, plow up one or two rows of oldest berries every year and plant to potatoes, following with new vines; thus always having a part new setting, a part bearing one year and a part bearing two years and a continuous renewal of healthy plants.

*Black Raspberries.*

After preparing the soil same as for strawberries, make straight rows seven feet apart, and plant three feet in row. The roots should be well spread out in their natural position and the dirt well firmed about the roots, but not planted too deep. Cultivate thoroughly, and keep free from weeds.

A mulch of coarse manure or what is better, green clover, cut in the blossom, will hold moisture, prevent weeds from growing, keep the ground rich and the berries clean. When new shoots are 15 or 18 inches high, pinch them off. This will cause laterals to grow, which should be cut back in the spring to 12 or 15 inches in length. When the fruit is all gathered, cut out old and young weak canes and burn them.

Red raspberries are treated in the same manner, excepting they should be planted deeper, and are not cut back in the spring. They spread very rapidly, and all plants excepting five or six stalks for main hill, must be treated as weeds and hoed out.

*Blackberries*

require same preparation of soil as strawberries and raspberries.

Plant in hills three feet apart, and in rows seven feet apart. Hoe, cultivate and mulch same as for raspberries. When new growth is 15 or 18 inches high, pinch tips back. Cut out old canes after bearing, and burn them.

Blackberries and most kinds of raspberries need winter protection in this climate, and are best covered with fresh earth. In laying them down (the rows running north and south), commence at the north end, remove the dirt from north side of hill about four inches deep, gather the branches in close form with a wide fork, press gently to the north, place the foot firmly on base of the hill and press hard, bending the bush in the root until nearly flat on the ground, and hold until second man covers with dirt. The top of succeeding hills will rest near base of preceding hill, making a continuous covering. This process is an important one, and will be easily acquired by a little practice. In the spring remove the dirt carefully with a fork, and raise the bush.

We support blackberries and raspberries by a No. 12 wire on each side, attached to posts at each end of the row, and resting on nails driven in stakes about twenty-five feet apart. This support protects bushes from heavy winds; the fruit from dirt, and makes hoeing, cultivation, mulching and picking much easier.

Blackberries require no trimming in the spring, excepting to prevent too large a growth of fruit. For large fruit trim freely.

*Currants and Gooseberries*

can be as easily grown on rich, deep soil as potatoes. Set in rows six or seven feet apart and three and one-half feet in the row. Cultivate them thoroughly, and keep center of bush well trimmed out.

Both are subject to the attack of the currant worm, which can be as easily exterminated as the potato bug, by using white hellebore (one ounce dissolved in three gallons of water) and apply with sprinkler on lower and center leaves at their first appearance, about the time the fruit forms. Repeat the application a second time, or even a third if necessary.

In the growing of small fruits, I make no iron clad rule to govern all minor details.

The selection of a location, the quality of soil, the varieties to grow, the manner of planting, trimming and many other things must be determined by circumstances and your own good judgment.

There are, however, certain essentials which cannot under any circumstances be omitted without loss if not certain failure.

The ground must be rich and well prepared.

The plants must be vigorous and adapted to your needs.

The roots must be well spread and the earth made firm about them.

The ground must be frequently cultivated and kept free from weeds.

Winter protection, for small fruit plants is an absolute necessity in Wisconsin except for the current and gooseberry.

In close connection with this subject let me say, the greatest need of Wisconsin farmers and horticulturists to-day, is organization and the adoption of more exact business methods.

Great success in banking is attained

only by exact business methods and absolute accuracy in every account.

The merchant succeeds best, knowing the wants of his customers and the proper way to display his goods.

The manufacturer's success is in producing the largest amount of the best goods at the least cost.

The commercial man's study is to distribute products to the best advantage and at lowest rates.

The good farmer or horticulturist should possess the accuracy of the successful banker, the tact of the prosperous merchant, the close economy of the manufacturer, the courage and energy of the commercial man.

Yes, more! He should have a pride and respect for his business.

He should feel that there is no position, no profession and no business more honorable than that of tilling the soil.

He should feel that in studying the possibilities of his farm, he is doing as necessary work as the doctor.

He should feel that in breeding his stock well, it is as important as the lawyer's work. He should feel that in feeding stock or farm to the best advantage, it is just as honorable as preaching the gospel.

The farmer or horticulturist is ruler over a miniature kingdom, and if he rules well and performs the rustic duties of the farm with intelligence and fidelity, forgetting not his duty to country, neighbor, family or self, he is the peer of any man who walks the earth, be he king, president, senator, judge, professor, lawyer, doctor or divine.

Our institute work is to develop just such farmers.

We can, however, have institutes only once a year, and they should be supplemented by the organization of local farmer and horticultural clubs to carry on this good work.

We need a good horticultural or farmer society in every good town and representatives to our state meetings from every locality.

We want hundreds of members where we now have tens.

We want acres of small fruit where we now have rods.

We are paying thousands of dollars to other states, every season for fruit that should be grown here, and the great northwest is clamoring for berries we cannot supply.

How easy to organize societies. A simple constitution that may be written on paper no larger than your hand, is all that is needed as a basis for your work.

Five or ten persons may organize a society as easily as a hundred and receive the same benefit.

There are many reasons for it. I mention only one or two.

Ten or more, decide to set out a fruit garden as recommended and organize a society.

Let the secretary subscribe for several first class agricultural and horticultural papers; let him also ask for the several state reports, agricultural, horticultural, bulletins, etc., etc. All will be furnished cheerfully and without charge.

In this way, you can provide a large amount of good reading at moderate cost for general circulation among your members.

These benefits cannot be measured in dollars and cents.

From an eastern retail price list of nursery stock, I find it will cost $52.50 to purchase plants enough for one of our farmer's fruit gardens.

Now mark well, what organization will do.

Let the same ten persons setting ten different gardens, make one order as a society, for all the plants wanted, demanding same at 1,000 rates and any responsible Wisconsin fruit grower or nurseryman will furnish them for $12 each, thereby saving to each member $40.50, and to the society $405, in this single purchase.

Therefore I say, organize at once, it will benefit you socially.

Subscribe liberally for good papers, it will benefit you intellectually.

Plant a small fruit garden, it will aid you financially and add comfort to your family and friends.

My faith in the citizens of Wisconsin leads me to hope that many new societies may be organized and that thousands heeding these suggestions, will soon rejoice in the possession of a model small fruit garden.

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*DISCUSSION.*

MR. GIBBONS — Does it make any difference which way you lay those blackberries?

MR. THAYER — I prefer to lay them to the north, because in raising the bush in the spring you need not get them in an upright position and the new growth coming up on the south side partially shades the fruit. I also prefer to have the rows run north and south, because I get a better distribution of the sun and heat during the day. Whereas if they run east and west the south side of the bush gets all the sun and the north side all the shade.

QUESTION — Do you remove the dirt only from north side of hill in the fall when you bury them?

MR. THAYER — On my soil, a sandy loam, I find it necessary only to dig the dirt up on the side towards which I lay them down. On a stiff clay soil you will find it more difficult to do, but will easily acquire the needed knowledge with a little care and patience.

QUESTION — I should think you would be apt to strip the bark, or damage the stalk when you lay it down.

MR. THAYER — No, you injure very few bushes that way. I lay raspberries down in the same manner, even the most hardy; it pays to lay down. I know it seems like a great undertaking for a farmer to do this work, but I put down twenty-five acres last year. Two men when they become used to it will put down half an acre a day, and cover them. I cover them as shallow as possible.

MR. RICE — How far apart would you set the strawberries?

MR. THAYER — That depends on the variety you grow. I plant mine in rows 3½ feet apart and set the plants two feet in the row. In the fall after the ground is frozen, I recommend covering them lightly with clean straw, marsh hay or coarse manure, and raking that between the rows in the spring.

MR. PENNELTON — Why do you pinch your blackberries so close to the ground?

MR. THAYER — The blackberry grows on the end of the laterals, and by nipping them back when 15 or 18 inches high you largely increase the laterals, and the same with the raspberry. Also if your stalks grow in that way you lay them down easier than if in one big stalk.

MR. BRAGG — What time do you set out your strawberries in the spring?

MR. THAYER — Just as early as you can get the ground in good condition.

MR. POTTS — What time in the year do you pinch back and trim your raspberries and blackberries?

MR. THAYER — This pinching back is done whenever the new shoot is about fifteen or eighteen inches high. All bearing canes, both raspberry and blackberry are cut out and burned as soon as fruit is picked.

The raspberry is trimmed back severely in the fall just before laying down, and dead ends, if any, removed in the spring after taking up.

The blackberry I trim only after the fruit is set, and then to correspond with health and vigor of bush.

MR. GREEN — When do you you take them out of the ground?

MR. THAYER — I remove the dirt in the spring before the buds start very much.

MR. WILCOX—Mr. Barnes said in covering berries, he takes a fork full of dirt out of the front of them, and then takes the roots and presses them over. Do you push them over on the other side?

MR. THAYER—It is not necessary in my light soil. In a clay soil, and especially where the bush has run a number of years and become quite heavy, they may sometimes have to do that. I don't think it injures the bush very much.

MR. GREEN — After the blackberry fruit is set, what portion do you cut out?

MR. THAYER—That is a difficult thing to decide. Your judgment must come in there, but as a rule don't be afraid to trim. If set very full you can cut off one-third or one-half the buds, and your fruit will be much nicer for doing it. There is little danger of trimming too much.

MR. FAVILLE—Mr. Thayer, can you give us any recipe that will make the shiftless farmer like myself take good care of the garden after it is set out?

MR. THAYER—Well, for the average farmer I should begin and make him over first, but to a man who is a little further along I should say attend the farmers' institutes, and in a few years you will get up to a point where you will conclude it is best to do it. If you have fifteen cows, let one cow go, and put the work of that cow into this fruit garden. If you are raising fifteen or twenty acres of potatoes, drop off one acre. There are plenty of farmers fooling away enough time raising eight or ten bushels of wheat to the acre to plant three or four such gardens.

Here is a quarter acre garden that represents seventy-five or eighty dollars right in your pocket; it represents health, and comfort and inspiration, and everything good on a farm, and you say you have no time because you must half cultivate some corn or potatoes or old meadow that gives you a mere pittance in return.

MR. WILCOX — Do you recommend planting strawberries in the spring?

MR. THAYER—Yes, as early as you can; don't allow any fruit to grow the first season; your runners grow and form plants, and next year is your best season.

MR. FAVILLE—Isn't it a fact that the average farmer can buy fruit cheaper than he can raise and pick it?

MR. HYATT—I never was so tired when it came three minutes to 12 but I was glad to go and pick a quart of strawberries.

MR. THAYER—The trouble generally is, to prevent the fruit being picked. I don't care how tired a man is, a good fruit garden will rest him wonderfully.

There are some men like my friend Mr. Faville that it will take all their

time to attend the garden, and then it won't be done.

In all seriousness will it pay? We all know we can raise fruit ready to be picked for the table or market for three or four cents a quart. The farmer if he wants that fruit must pay sombody a cent a quart for picking it, a cent for boxes, about two cents for express, another cent for commission, and we fruit growers must have a cent or two profit. Thus we have to get six or seven cents out of it which the farmer can save if he raises it himself. It is a question for you to figure. It seems to me like a pretty big per cent, but if you want to pay somebody $75 for this quarter acre of fruit you will find fruit growers generous enough to furnish it.

QUESTION — How long do you keep cutting off the strawberry runners?

MR. THAYER — That is where judgment comes in. It takes more good common sense to run a fruit farm or any other farm to the best advantage than to run a bank. I should cut off the first runners until about August 1st, depending somewhat on the season and varieties grown.

MR. HOFFMAN — Provided one-third of the farmers in the state went into this fruit business raising one-fourth of an acre, would there be any money in it outside of his own use?

MR. THAYER — I would not advise a farmer to raise much for commercial purposes, or any one else either unless they are situated right. Near a little town you can often pick up a few dollars pin money or grocery money if you have more than you need at home.

MR. RICH — What treatment do you give your strawberry bed after taking off the first crop?

MR. THAYER — I would mow the vines off and remove them or burn them dry. Cultivate thoroughly and take out all weeds. The second year about all the treatment is to keep the weeds out.

MR. GREEN — Would you use ashes on strawberries or raspberries?

MR. THAYER — Yes, especially on light soil, ashes are a great benefit to all fruit.

MR. RICH — If farmers had to buy fruit, how many would buy a quart? I have been in the produce business several years and I know the farmers buy very little fruit. They often go into a saloon and spend enough to buy two barrels but they seldom take anything home.

MR. THAYER — I undertake to say it is more profitable for a farmer to raise his own fruit than it is his potatoes at $1.00 a bushel, his wheat at $2.00 per bushel or his pork at $6.00 per hundred. Why not buy your potatoes, your wheat or your pork? I believe a man will have to raise at least six acres of wheat to get as much benefit as he will from this quarter of an acre; I believe he would have to raise five or six acres of corn to get the same benefit.

MR. PIER — What remedy do you use to prevent the blight.

MR. THAYER — I never have been troubled with it. We have been troubled a little with rust. In that case I dig up the bush, root and branch, and burn it.

MR. HOLMES — As long as evaporated blackberries and raspberries bring from twenty to forty cents a pound I don't think you can overdo the small fruit business near the cities. The fact is the more fine fruit you raise the more people will want it.

SUPT. MORRISON — Mr. Thayer is doing good missionary work. Some of the finest farmers in this state don't have a garden and it is bacon and pork and potatoes, and potatoes and

bacon and pork the year around. I believe that over one-half of a farmer's living can come out of his garden, but he will say, "Oh, it don't pay." Any intelligent farmer who knows how to raise potatoes and corn can take an acre of ground and have part of it in fruit, and part in vegetables, and have it in long rows and raise vegetables very cheaply. I know one year I raised vegetables in my garden, and supplied to four or five families, and did it for less than many farmer's spend upon an onion bed. If I were a farmer's wife I would run away if I had to cook the way they do, and with the material they have year after year. I hope these talks will do some good, because it only requires a little gumption, a little common sense and industry. If you would spend one-tenth of the time you spend between your farm and the nearest village, you would have good gardens.

C. P. GOODRICH—I know of one farm which has a good fruit garden like the one just described as the result of hearing a horticulturist talk. My boy, then about 18 years old, heard Mr. Hamilton, I think it was, talk on "The farmers garden" at an institute. He was interested and wanted to plant one so that we could have more and better fruit than we had had. I told him he might have one-third of an acre of good land near the house, and I would furnish the money to buy the plants and the material to fence it, if he would promise to take good care of it. He promised, and the garden was planted. The plants and material for a lath picket fence cost about $20. The garden has been well taken care of, and managed according to the instructions of the horticulturist. Now we all have plenty of nice fruit to eat and some to give away. Some is sold occasionally for which *he* gets some money I have never heard any one complain, at my house of the hard task of picking the fruit.

MR. ARNOLD—Let me offer a suggestion. If you want a good garden, you want to marry a thoroughbred wife.

MR. THAYER—Will Mr. Arnold please tell what is to become of us poor mortals, who are already married, and didn't get a thoroughbred?

MR. ARNOLD — You want to get that wife interested in this garden, have it impressed on her mind that the family will not be healthy without it, and if you don't have a good garden in a little while, you will be pretty sure to have a continual thorn in the flesh?

SUPT. MORRISON—Isn't it the wife who generally has to get the husband interested?

MR. ARNOLD—Yes, quite often, and if she does become thoroughly interested, nine times out of ten you will have a fruit garden.

SUPT. MORRISON—I have been at Mr. Arnold's, and he has a fine vegetable and fruit garden, and I give all the credit to Mrs. Arnold.

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Music—Solo.

SUPT. MORRISON—It gives me great pleasure to introduce the next speaker as a gentleman who does not believe that the vocation confers honor upon the man, but that the man confers honor upon the vocation. He is proud that he is a farmer.

Hon. C. R. Beach of Whitewater, one of the present regents of our state university, will give you a paper.

# WHAT CAN THE GOVERNMENT LEGITIMATELY DO FOR THE FARMER?

BY HON. CHAS. R. BEACH, Whitewater, Wis.

Within the past few years there has developed among farmers through the country, a feeling of discontent. A belief that the cause of low prices of farm produce was attributable, in part at least, to wrong legislation, or to put it more mildly, to a want of right legislation, both state and national. That combinations, using large aggregates of capital, were either through governmental aid, or through governmental neglect, absorbing an undue share of the accumulated products of capital and labor, and that farmers had special grounds of complaint.

### *Farmers' Organization.*

As a result of this sentiment there has sprung up various organizations, composed mainly of farmers who propose to act together politically, and perhaps otherwise, for the purpose of so modifying national and state laws, as to place farmers on better footing. These organizations extend over many states and their membership numbers many thousand voters. Indeed so strong have they become that in the last fall elections, they elected representatives in both houses of congress, and they also hold the balance of power in several state legislatures.

I, for one, rejoice in this movement, (not that I believe the evils complained of are as great as represented, or that prosperity can be restored to the farmer to any great extent through legislation). But, I believe that it is not only the right but the duty of every citizen, be he farmer, a day laborer, or in any other business to interest himself in all questions of public policy. We are very prone to forget that the people are the government, and if there are any laws in the land that in any way discriminate against the farmers they have themselves to blame. It must be either their ignorance or their indifference that makes legal wrongs against them possible. The farmer will never be a good citizen until he becomes a politician, not that he may hold office or simply advance his own prosperity, but that he may do his share of promoting the best good of the whole country. Although the farmers constitute a majority of the voters of the whole country, they have never, in either house of congress, had anything like a fair representation, and if they have been represented at all, it has been mainly by proxy, and I am inclined to the opinion that a right smart admixture of the granger element in both state and national legislation would not only be refreshing but invigorating.

We are all willing to admit the good effect of grange legislation in 1874 in this state. Since then no R. R. President, has by proclamation, openly defied the laws, as did the presidents of the St. Paul and North Western roads at that time.

### *Educational Factors.*

But I rejoice in these farmers' movements mainly on account of their educating influence upon the farmers themselves.

Hitherto farmers have been more in-

clined to grumble and find fault than to point out clearly what they believed to be wrongs and show how to right them. They have never set up reforms. But if these movements mean a new political party, it must have clear and well defined objects and principles, and before those objects can be obtained, they must not only convince themselves that they are right, but also convert a majority of voters to the same opinions.

To do this will require a broader and more comprehensive knowledge of governmental affairs and a greater amount of intellectual activity than is now possessed by any considerable number of the most intelligent farmers.

There are many things in the platforms and resolutions that have been indorsed at various times and places by the various farmer organizations which seem radical, visionary, impracticable and perhaps revolutionary. But knowing how conservative the majority of farmers are, it is fair to presume that the sentiments these resolutions express may be attributed to the self-appointed leaders in these movements, rather than to the rank and file of the farmers. If the farmers expect any good they should not aim at *impracticable ends*. They should not claim for themselves any special favors, or attempt legislation, looking to their special benefit.

There is no more reason why farmers should have the benefits of sub-treasurers or money loans more than the manufacturer, or the merchant or the mechanic. Neither should they while denouncing trusts and monopolies and demanding their extinction, be planning to form trusts and monopolies compared with which those of which they complain so bitterly, dwindle into insignificance.

But let us try and get nearer to our subject, What can government legitimately do for the farmer?

That I may not be misunderstood, let me say that I entirely discard the idea that the farmer has any need of special legislation in his favor, but partly owing to the changed condition of things and partly owing to the indifference on the part of farmers, they are carrying some burdens that ought to be lightened, and one of these burdens is an unequal and an unjust proportion of taxation.

### *Just Taxation*

Taxation, to be just, should be in proportion to the property owned by the individual or corporation taxed. But will anyone claim that such is the fact?

The total assessed value of the property in Wisconsin in 1888, was $581,000,000; $303,000,000 was on land outside of cities or villages, $152,000,000 on real estate in cities and villages, $126,000,000 on personal property, of which last amount $52,000,000 was on live stock and tools on farms, leaving $74,000,000 of personal, other than stock on farms for the entire state. So that the farmers of this state pay taxes on an assessed valuation of $355,000,000, as against $226,000,000 of all other kinds of property in the state, or three-fifths of the taxes in the state, and five times as much as paid by the entire aggregate personal property outside of farms, in the state. And when we remember that a large per cent. of these farm lands is mortgaged for sums, which in the aggregate will amount to many millions, we can form some idea of the unjust burden of taxation borne by the farmer. Is any one so unsophisticated as to believe that all the personal wealth in Wisconsin, its bank stocks, its mortgages and notes, and other debt obligations, its stock of machinery and mer-

chandise, and its millions of manufactured products, amount all told, to only one and one-half times the value of the live stock owned by farmers? Why! The yearly product of our manufactures will exceed by many million of dollars all the product of all the farms in the state.

Mr. Thim, president of the Massachusetts equal tax league, gives data by which he estimates the amount of chattel property in Massachusetts that escapes assessment not much if any less than two thousand million of dollars; he says farther, if this amount be lowered to 1,200 million, and was assessed and payed taxes in the same proportion as that which now pays taxes, the extra sum realized would amount to more than all the annual accumulated wealth realized from farming by all the farmers in the state.

A Bostonian died not long since whose estate showed that he had dodged the average tax of 5,000 tax payers.

A writer in the Prairie Farmer claims that in the state of Illinois there are 214 corporations with 150 millions of dollars of paid up capital that are assessed less than five per cent. on their capital stock while the farms are assessed on a basis of 33⅓ per cent. on their full value. That when farms of the state amounted to 75 per cent. of the property of the state, they paved 80 per cent. of the tax, but now when the farm lands constitute but 24 per cent. of the property they pay 85 per cent. of the tax. And here I might and perhaps ought to stop, but there is one more point that I wish briefly to call your attention to.

### *License Money.*

Under our present excise system, license for the retail sale of liquors is granted by incorporated cities, and villages, and the moneys obtained from such license is spent for the sole benefit of said city or village. To how large a sum these moneys will amount, I have not now the means of knowing, but it is a very large sum, amounting to many thousands of dollars.

In the little city of Whitewater, near my home, a place of about 5,000 people, six thousand dollars is paid annually by twelve saloons. Of this sum I, as a farmer living outside of the corporation, secure nothing — but three-fifths of the pauperism, and crime inseparable from the drinking of the liquor sold, falls upon the farmer who has in no way secured any benefit. Surely the evils growing out of our unequal methods of collecting taxes is a legitimate sphere of legislative reform which, if carried out, would be of great pecuniary benefit to the farmers of the state.

### *Adulteration.*

But there is another subject of equal, if not of greater importance, than unequal taxation. I refer to the selling of fraudulent and adulterated foods. Unjust taxation affects us only in our property, but the selling of fraudulent foods robs us of our money and may endanger our health. Tax paying comes but once a year, but these frauds find their way to our table three times a day. Tea, coffee, mustard, spices, vinegar, sugar, lard, confectionery, honey, molasses; these form only a partial list. Vinegar compounded out of deleterious acids, syrup mixed with glucose, candies made heavy with gypsum, pipe clay, chalk and yellow chromate of lead, red oxide of lead, white lead and vermillion, cream of tarter with no cream of tarter in it; I might extend the list indefinitely would time permit. As a consumer of

these products, the farmer suffers equally with other members of the community.

But these compounds, by skilful manipulations are made to assume the appearance and the name, and to take the place on the market, of legitimate products of the farm.

The farmer has just cause of complaint, and is justly entitled to governmental interference and protection.

Watered milk, filled cheese, oleomargarine sold as butter, compound lard, these so interfere with legitimate production, that profit of farms is turned into loss. That government is recreant to its duty that does not furnish both to the *producers* of pure food and to consumers, perfect protection against fraudulent compounds free of cost. No matter whether these compounds be harmless or harmful. To do less is to *debauch* the moral sense of the whole community. If fraud may be tolerated in one direction, where will you draw the line? And when will you stop?

The good work so well begun in this state should be perfected and carried out. The interests of the whole community require it, and the farmers have a right to demand it.

### *Improved Highways.*

The value of any section of country for farming depends largely upon the character of its public highways, by which market towns may be easily reached. We have many things in our state of which we may be justly proud, but the list will not include our county roads.

Nothing can be more vicious and unbusiness like than our whole system of constructing and maintaining our county highways. These roads belong to the state, they are for the benefit of the whole community, and the state should keep them in repair; but under present laws the whole expense falls upon the farmers who own lands bordering these highways. The care of our county roads should be in the hands of thoroughly trained, practical road makers, whose special and professional business is to make roads. One-half, three-fourths, nine-tenths, fifteen-sixteenths of the money and labor expended under our present methods is worse than thrown away.

Government could legitimately help the farmer and the whole community by making the care of roads a distinct department and then provide funds to maintain them.

### *Will The Farmer Become a Mere Tenant?*

Hitherto the surplus accumulations of wealth have found investment in railroads, in bank stock, in mining, in manufacturing or in commercial enterprises. But it is the opinion of many thoughtful men, that as wealth increases and competition for places of profitable investment grow sharper, capital will seek investment in farming land. So that in the not distant future, those who work the land will be mere tenants at will, subject to the caprice of landlords. Should such a state be ever possible, then farewell to the bright dream of a coming millennium for farmers, but I do not take so desponding a view; but one thing is certain that while population and wealth are rapidly increasing, the soil whence coming generations are to draw their support, is a fixed quantity — and there is another fact that has much significance. It is claimed that there is already owned or held in this country by foreigners, individual capitalists or by syndicates, more than 40,000,000 acres, an area greater than the whole state of Wisconsin or Illinois. We

see then that the danger to which I have alluded may not be impossible.

*The Land Should be Owned by Our Citizens.*

I hold that the soil of this nation should be the exclusive property of its citizens. That no one who is not a citizen should *ever under any circumstances* be allowed the ownership of a single acre.

And more than that, the amount of land that could be owned by a single individual or corporation, should be so restricted and fixed at so narrow a limit, as to offer no temptation to acquire wealth through a tenant farming.

Here is legitimate work for government in the interest of farming, and in the interest of civilization, to preserve the ownership of the soil inviolate for the food producer of the land.

*An Education for All.*

There is one subject I rejoice to say, upon which there is little difference of opinion, and that is the right and duty of government to furnish the opportunity for every one to educate himself up to the highest possible efficiency in the line of work he has chosen for himself, even though it be farming. This is better than giving or loaning money, for it is helping one to help himself.

The central thought in modern systems of education is to make one better able to do *something* and on the score of educational opportunities, I think the farmers have no reason to complain, but rather to congratulate themselves.

The provision of the general government has been most munificent. First the liberal land grants for agricultural colleges. (And if these land grants have not been wisely used, no one is to blame more than the farmers themselves).

The establishment of an agricultural department of government, the granting of yearly appropriations for experimental stations, the monthly crop reports, the condition of foreign markets, the weather bureau, these and much more that I could name show how willing the general government is to respond to the needs of the farmers. And the state has shown equal liberality. Its appropriations for fairs, for dairymen's associations, and above all for farmers' institutes — all these show how ready government is to reach out a helping hand in giving to farmers the opportunity of learning the foundation principles upon which success in their business depends.

*Impracticabilities.*

The limits of my paper will permit me to speak only in a general way of those matters to which farmers' organizations attach chief importance, viz.: Corporations, transportation, monopolies, trusts and direct governmental aid to farmers by subtreasury schemes and direct loans of money to farmers. As to corporations, they have no natural, but only vested rights; and it is the duty of the government to watch with jealous care that the powers granted, should be in no way detrimental to the general good, and they should be held to the strict letter of the law that created them. And they should also be made to bear their full share of expenses incidental to governmental protection, and if at any time it is found that they are in any way working harm to legitimate business or personal rights, their charters should be taken from them. How many would cease to exist if the laws were enforced? I do not know, but I think a good many.

But transportation is as much a necessity to the farmers of Wisconsin, as the possession of land. As to railroads, I have long thought that there was a class of would-be reformers who, by general denunciation rather than by facts and sound reasoning, attempt to prejudice farmers against the railroads. I am not here in any sense in the interest of railroads. They were not built and equipped as a matter of pure benevolence and it is fair to presume that they are run in the interest of the stockholders; but it does not follow that there is any antagonism between farmers and railroads. Railroad men are sharp enough to know that the prosperity of the roads can only come through the prosperity of the business of the country, farming included. In the year 1888, the railroads in Wisconsin earned over seventeen millions of dollars by carrying freight at a cost of less than one cent per ton per mile. To have moved that amount of freight in England would have cost three times that amount. The decrease in the cost of moving freight in this state in ten years is over 50 per cent. What could Wisconsin farmers do without the railroads?

Whatever cause of grievance the farmers of other states may have against the railroads, the number in Wisconsin who cherish any feeling other than good will is extremely small. If the farmers have not for the last few years made all the money they could have wished, they will find it in other causes rather than in the extortion of railroads.

It is not to be presumed that our railroad laws are perfect, but in our effort to reform them let us be actuated by a desire to promote the good of the state rather than by a desire to punish the railroads. Perhaps a board similar to the Inter-State commerce commission, acting within the state, upon which should be a fair per cent. of railroad men, might help to correct abuses, and settle difficulties that may arise.

### *Trusts and Monopolies.*

Standing here as a farmer and speaking in the interest of farming, I shall not discuss the question of trusts and monopolies until it is determined whether it is for the interest of farmers to establish them. If they prove good for the farmer, they must be good for everybody else, for I hold there can be no real antagonism between the legitimate business interests of any country.

The legitimate duties of government are mainly negative. To prevent the doing of wrong; to see that no individual or corporation encroaches upon the rights of any other individual or corporation; this is legitimate work.

### *Work Out Your Own Salvation.*

Progress, wealth and civilization are not the result of governmental acts, but of individual effort. The individual is the unit of society.

To educate, train and develop the individual so that he shall by his labor produce the highest possible results, is the final end of the complex machinery of society; to make each individual man stronger, better and more self-reliant.

Says Carlyle, "In the end there is no help for a man, or any hindrance either, except what lies in himself." For a whole class to ask for government loans is a confession of weakness. It is acknowledged that the world is too strong for them. It does not argue well for the ability of the farmers to run the government if they cannot run their own business without governmental aid. And herein is the weakness of much of the organized effort to benefit classes. The personality of individual members is

lost sight of in the effort to benefit the mass.

How will the individual members of the great National Farmers' Trust, about to be organized, be better educated, and better equipped for doing their share in the world's work by banding together "in a combination whose spirit and aim they have hitherto so loudly denounced, and then for each farmer to sink his own individuality and appoint over himself a Lord High Captain who shall have the disposing of the fruit of his labor, to do the thinking for him, as to whom and when and at what place to sell the products of his farm? Is that the way to educate the farmers of the great north-west to self rule and judgment, and make them feel that they are equal to the work they have undertaken in managing a farm, and though it make their labor profitable to themselves and helpful to others, and if the wisdom of the leader fails, who stands the loss?

*Don't Choose Demagouges For Leaders*

It is true now as it was three thousand years ago, that he that tilleth his land shall have plenty of bread, but he that followeth after vain persons shall have poverty enough, and the better the tilling the greater will be their profits. As I said in the outset, I rejoice in this new political awakening among farmers and I think good will come of it. But they must not expect to revolutionize the country at once. Were the farmers to be put in complete control of all branches of government, I should not expect any great amount of pecuniary benefit to come to them. Government never has nor ever can have any power over the law of supply and demand. It can never make a poor bullock worth as much as a good one or make a bushel of corn worth as much in Nebraska as in Chicago.

It is fair to presume that the laws against which farmers complain most loudly were not enacted with a view of discriminating against them, and that the changed condition of things which now make them unjust call for a corresponding change in legislation.

Society in its corporate capacity, does not arbitrarily discriminate against individuals or occupations; honest, intelligent and successful work in any business wins recognition. And if we as farmers do not exert as great an influence in the body politic as our numbers entitle us, may we not attribute it to our having failed to intelligently comprehend and systematically show by our practice the possibilities of our business? And before we claim the privilege of reforming the government, ought we not to prove our ability to do so by reforming our practice as farmers?



# THE DAIRY TEMPERAMENT IN COWS.

BY EX-GOVERNOR W. D. HOARD.

*Mr. President, Ladies and Gentlemen:*

I am to talk to you to-day upon the dairy temperament in cattle, and in so doing, I want you to get a clear idea of what I mean. I shall not make an exhaustive statement of this subject, but simply touch upon a few points belonging to it. The farmer of Wisconsin ought to be, by virtue of necessity, a breeder of domestic animals, and he ought to do it intelligently, he ought to understand the lines of breeding just as they do in England. Out of that wonderful little island has come a marvelous number of breeds of domestic animals, the Shorthorns, the Devon, the Hereford, the Redpolled, the Sussex, all these breeds of cattle stand out to-day as embodiments of an idea. There are the different kinds of hogs and of sheep. The farmers of England have made a record which is authority for the whole world, and they have done it by virtue of hard study and intelligence. It is a grand thing to be a farmer in England, for the reason that the best minds of England are farmers. The land of England and the problems of agriculture were turned over to the very finest brain in it.

### *Unprofitable Cows.*

With us, it is different. It seems sometimes that the farmer in the United States is the last man who pays any attention to the improvement of his domestic animals, and yet he ought to be the most interested, because it means prosperity to him. I will illustrate what I mean. Take the average Waupaca county cow, and my word for it, she does not make 125 lbs. of butter a year. That butter is worth perhaps on the average, fifteen cents a pound. Now, that cow is a representative of the intelligence of the man who stands behind her. What she is, he has made her. Like cow, like master, and if that cow does not make a profit, who is to blame but the man who bred her and owns her? That man never studied the meaning of a cow, never looked into her physiology, and make-up, and very likely he complains he is making no money, and the revenues of the whole state are set back because he refused to sanctify labor with knowledge.

Let us for a moment go onto the race-track. Is there a farmer in this country who would for a moment think of breeding horses for the race track by introducing draft blood? No, you have studied that subject enough to know better. Now, don't you know that breeding a cow is subject to the same laws exactly that the breeding of a horse is? Nobody ever saw a horse that had a draft form that was a trotter. Nobody ever saw a foxhound that had the form and shape of a bull dog, that was a runner. Nature invariably gives to every animal the form that is necessary for its function. Now, we must have dairy cattle if we are going into the dairy business, and nine times out of ten, in this country, we have commenced wrong. Farmers all over this state have gone into the milk business and have no idea half the time as to what constitutes a profitable cow. They go along mechanically paying no attention, and acting as though they

thought one cow is as good as another. This touches no man but the farmer. I have sympathy for him, and I want to stand him up and talk this thing straight into his face and into his comprehension.

*The Home of the Dairy.*

Wisconsin is a dairy state not a beef state. We need intelligent thought. We need to know how to breed a dairy cow, how to handle a dairy cow, and how to feed her, and the most essential thing to start with is the question of of breeding. Men will stand up in a meeting like this and sneer about breed and pedigree. They don't know what they are talking about. An old fellow jumped up in an institute once, and he says, "You may talk as much as you are a mind to about your breed, but I tell you the breed is in the corn-crib." That is half a truth, the hardest kind of truth to handle. I said to him, "my dear sir, by that I understand you to mean that you don't pay any attention to breed, but everything to feed." "Yes, that is it, sir." "All right, you are the man I have been hunting for. You have given me a short cut to success. According to your doctrine it don't make any difference what kind of a horse I have, I can feed him so as to make a trotting horse of him, can I? Won't you give me your recipe so I can make a Poland-China out of one of those old razor-back hogs that used to run in the woods? How would you feed him to make a Berkshire out of him? How would you feed a Jersey cow to make a Short-horn of her? How would you feed a Norman horse to make a race horse of him?" The old man stood and looked at me a moment, and then said: "Well, talk just as much as you are a mind to, I believe what I said." That is the position of many farmers to-day. They see the half truth and they don't want to see the whole truth. One old fellow said he didn't want to know any more, it might make him uncomfortable.

*Temperament.*

In cattle as in men, we have what is known as a temperament. A man with red hair and light skin belongs to the sanguine temperament. A man with black hair and a dark skin is classified in physiology as belonging to the bilious temperament. Another man is of a phlegmatic temperament. Now temperament governs function. The breeders of England, hardly knowing what they did, took the Short-horn and commenced to breed them for flesh and have continued to so breed them, encouraging the tendency to lay on flesh, and establish a form like this Hereford whose picture hangs before you. They have bred to fill out the ham, to square out the form, to close up the hip and to shorten and thicken the neck. Those men have bred that animal along the line of the phlegmatic temperament until to-day you have an established heredity in the beef line. That is the law of heredity, and we base all breeding operations upon that law.

*Special Lines of Breeding.*

Here is another line. The Hollanders took this cow a thousand years ago, and proposed to breed her for the production of milk. They were obliged to give her a totally different form. Here you see the open expression of the barrel; you have the lean bony outline of the nervous temperament. Dairy breeders breed for the enlargement of the nervous temperament. Now what do we mean by that? Thousands of men think we mean excitability. I want you

o remember that nervous means a trong, powerful, nervous machinery, nd not excitation. You can make such nimals very excitable, but they are not ecessarily so.

The dairy temperament is built upon he nervous temperament. A cow having this temperament strongly developed carries all her food into the lairy function and does not take on lesh. The ordinary farmer has an opportunity to study this question even in he selections of his cows. You go to our neighbor to buy cows, and you nust look at things from a dairy standpoint. I have been an auctioneer and old thousands of cows, and I have been ained to see the lack of judgment on he part of farmers concerning a cow.

*A Large Beefy Cow.*

Lead out a large, fleshy, handsome ow and men will bid right up, and a nan pays a good price for her simply ecause she is good looking while a ittle cow that apparently gives no indiation of her quality will go at a low rice. I went into the herd of a man o buy a cow and asked "What is your rice for a good cow?" He answered: 'If you take your pick I will charge you 60, if you take mine I will charge you 25." I asked him "Which do you hink I would take?" He replied, "You will take that large grade Durham cow giving forty-five pounds of milk a day." 'And which cow would you pick out?" He turned and showed me a little grade Jersey cow giving but twenty-five pounds of milk a day. He says, "She don't give enough milk." I looked her over and said I would take her at $25. I took the cow home and after I had wonted her I commenced testing her, and on the twenty-five pounds of milk she gave me one and a half pounds of butter a day and the other cow required thirty-two pounds of her milk to make a pound of butter. I believe this little cow was altogether the most profitable and yet that man had no clear idea of the value of a cow.

This question of temperament underlies the breeding of these cattle and so the dairy breeder breeds for the enlargement of the dairy temperament.

The beef breeders breed for the beef temperament, and my friends, for real profit there is no such thing as a general purpose cow. If you are the patron of a cheese factory or creamery, you are keeping your cow for the largest profits in milk and butter. You are not keeping her for beef, and yet hundreds of men say "I want a cow that when I am through with her she will turn out a good carcass of beef, so they will keep the cow until she is eight years old weighing five hundred pounds more, and constantly support that five hundred pounds of flesh for all those years in order to get for it one and a half or two cents a pound at the end of the time. Now the same feed that will make a pound of beef in a good butter cow will make a pound of butter. You know there are some horses that, if I feed them ten tons of oats, I could not get a mile in five minutes out of them. When it comes to the question of milk, you must figure on the machine. To the ordinary farmer who feeds cows for profit it is of the utmost importance that he study the temperament of the animal for the specific purpose for which he is keeping her. Does the farmer of Waupaca county go out hunting foxes with bull dogs? Of course not. Yet, what is the matter with him, that when it comes to picking out a cow he pays no attention to the breed.

### *The Dairy Cow.*

I want to speak for a few moments upon some of the points of a dairy cow. I will suppose I am standing in your barn yard, and I have $50 in my pocket which I am going to change for a cow. Now, what are the points I will look for? A cow gives an exhibition of her ability, first, by the shape and condition of her udder. Here is the object of her existence. This cow lives, moves and has being for the sake of this organ. She is worth but little for anything else; she is bred for this purpose. She is a mother. The man who bred her, did so with the object that she would be a little better mother than her mother. This cow belongs to the nervous temperament and shows it in her build; she has a lean head, long from the eye to the brain. She is an active animal. She shows a full eye and that causes a hollow in the face, a dishing face. There is an alert, keen expression in those eyes. That indicates her temperament.

Milk is evolved from the blood, the blood is affected by the breath, and you know how important good lungs are, so she should have large open nostrils. She should be long in the head. I want a cow to show all the brain I can get in her because the brain supports the whole nervous system, and this udder is the final answer to the long chain of nervous machinery. The brain is the battery which operates all the time to keep this nervous machinery running.

When the nervous system grows weak it is an indication that the brain action is weak. From the brain go all the nerves of the body. I want my cow to show a strong back. The first thing I look for in a butter cow is a very strong expression of the back bone, and I want it because a large back bone indicates a large spine, the large spine indicates a strong nervous channel from the brain and I know then that that cow has a powerful nervous machinery.

### *Motherhood.*

You will see in a moment why she needs a large nervous force. The deposition of milk is intimately connected with the brain. It is a question of motherhood, of maternity. If the brain is affected by any emotion it immediately affects the operation of the nerves here at the udder. Fear, fright, anger will affect it. This udder is enveloped with a net work of nerves called the sympathetic plexus. It is a wonderful piece of machinery. This net-work of nerves runs up here to the uterus. Think of it. Whenever you strike or abuse or deny comfort to this animal remember you are engaged in a piece of work against a mother. This net-work of nerves runs to the uterus, from there by way of the spinal chord, clear through to the brain.

### *Milk Fever.*

One of the clear proofs of this is the action of milk fever. It is the same that in human mothers is called puerperal fever. It is a mother fever, and yet thousands of men pay no attention to it. I lost a beautiful thorough-bred Guernsey cow last spring, because the man I left in charge of her did not adhere to the rules I had given him. He allowed her to lay out all night in a low, damp place. She was a highly organized cow, bred to breed highly organized calves.

This terrible milk fever shows the importance of the study of the nervous machinery. It starts in the uterus, it is a septic poison. At once Nature telegraps to the udder, "Stop secreting

milk," and it is stopped instantly. The disease progresses, and the inflammation begins to extend along the line of the plexus and finally it goes on until it reaches the spinal marrow, and the moment it reaches that, the cow drops. Paralysis ensues, and it keeps progressing, involving the spinal marrow and approaching the brain, and by and by the cow will knock her head against anything, and act as a person does who has brain fever. By and by she swings her head to one side and dies.

Such an emergency calls for dairy intelligence and handling. The man who handles dairy cows and does not understand how the functions of milk-giving are affected by care, stands in his own light. I heard old dairymen down in New York state last winter growling and cursing about the tariff, while their cows were out wading ankle deep in snow, and the thermometer seven degrees below zero, and they wondered why they got no milk. Why, any mother, any wife could tell him. Indeed, women know more about a cow than a man does. She understands the laws that govern motherhood. Remember that a cow needs warmth. The farmer forces her out into the cold and storm to drink ice water, or he keeps her in a barn cold enough for the excrement to freeze. Then he says, "I can't get any money out of this cow." You must give the mother comfort, you must give her cleanliness. There is hardly a stable in Wisconsin but what ought to be indicted. Why, my friends, you cannot make a cow profitable the way many of you are doing. You are standing in your own light. The cow needs dairy handling as well as dairy breeding.

### *Feed Dairy Rations.*

Just one point more. You must feed dairy feed. Bran, cotton-seed meal, or linseed meal, or some other protein food. I want half a dozen of you farmers in Waupaca county to sow some peas this spring. I have been studying up that subject for two years, and I find peas are a wonderful feed for the dairy cow. Two pounds of pea meal are the equivalent of six pounds of ordinary bran. Any good farmer can grow from twenty-five to forty bushels of peas to the acre. They must be planted deeply. You must not sow on the ground and drag them in. If you grew forty bushels of peas to the acre you would get the equivalent of $70 worth of bran according to present prices. Another thing, peas need to be sown about twice as thick as the ordinary farmer generally sows, from two to three and a half bushels to the acre.

Now, if I have said anything that is of any use to you, you are a thousand times welcome, and if I have said anything that hurt your feelings, remember that they were the plain words of a friend.

Adjourned to meet at 9:30 A. M.



# MORNING SESSION—MARCH 18th.

The Institute met at 9:30 A. M. Sup't Morrison in the chair.

## SOME NEW EXPERIENCE WITH THE SILO.

BY THOS. CONVEY, Ridgeway Wis.

I am afraid this audience will be disappointed with my remarks concerning the silo, as I have no new experience to relate except it be the experience of others. In building, filling and feeding from a silo, it is much safer to follow than lead, for there is no occasion for blundering in any part of the business, as explicit instructions are easily obtained. Siloing is now established on a substantial basis, and those parties who are inclined to experiment have to take their chances of success or failure. There has been a great deal of cheap talk about cheap silos, but a cheap silo is like other cheap articles, correspondingly poor, and I fail to see where it cheapens the cost to use part of an expensive barn in erecting a silo. It is simply a matter of convenience to have a silo in a barn. I built a silo adjoining the barn, and it cost, including labor, at least $2 for each ton it would hold.

A silo should have a good foundation, be air tight at bottom and sides, and sufficiently strong to resist lateral pressure. It should have a good roof, and be well painted on the outside, and well tarred on the inside. Should have three courses of lumber and one of tar paper and should be made of seasoned lumber. If put up in this way the roof will be the first to decay. The silo is now no experiment and should be substantially built. Mine is square but would be better in the rectangular form and still better if round. I know of one in Grant county built cylindrical in shape. With fence boards standing on edge, nailed together of sufficient thickness to form a sill for 2x4 studding, with three courses of ship lap, the outside course put on horizontally as was also the first course inside, then a course of tarred paper and the last course of ship lap inside, put on perpendicularly, this building cannot be sprung, as each board forms a hoop, and it may be built of any desired height, by spiking on additional studding. The circular form is the most capacious, it takes less lumber in its construction, is stronger, and has no corners in which the ensilage can spoil. It can scarcely be questioned that good corn fodder is nearly or quite equal in feeding value to good corn ensilage, yet it is more difficult to obtain good fodder than good ensilage, as good ensilage may be put up every year, while good fodder may only be obtained in favorable years. The amount of labor involved is in favor of the ensilage. To get the best results, feed-preparing machinery is necessary in either case, especially in stable feeding. The argument that it does not pay to feed grain to cattle, is a humbug, and the sooner we realize this the better.

It is only the grain fed cattle that pay for their keep, especially in winter feeding, and if the grain fed cattle do not pay, it is because they are poorly bred, or unskilfully handled.

I always want to have as much grain as possible in the ensilage, as I know of no way in which corn can be handled so as to preserve its palatability and digestibility better than in the silo.

It may be that the fermentation it undergoes in the silo, destroys as much of its feeding value as field curing. Yet I venture the assertion that intelligent feeders are almost unanimous in stating they get better results from feeding ensilage. I have tried soaking, shelling and grinding, feeding the fodder and ground feed separately, but gave it up for the much better method of cutting up corn and corn fodder together, feeding in this way and having hogs follow the cattle, but consider the silo as much of an improvement on the latter, as it was preferable to the first method.

Hauling fodder from the field as it is required, has never suited me. Storing in the barn is the most convenient way and this is sometimes attended with bad results. Stacking outside is the method usually resorted to, in the latter case, or in case you wish to cut the fodder, it involves a great deal of handling, as it is not safe to cut more than a week's supply at a time. This requires the frequent use of machinery, which is sometimes disagreeable in cold weather, and besides where you feed heavy on fodder there is considerable waste. Although the silo costs more with regard to size than a barn, we should not forget that ten tons of ensilage can be stored where we can store one ton of hay. Heating up in the preservation of ensilage does not appear to be a necessary condition, it is simply unavoidable; hence rapid filling gives the best results, wilting corn that is sufficiently mature injures the quality of the ensilage. Wilting immature corn removes some of the surplus moisture and produces better ensilage. Immature corn or fodder without grain cannot make good ensilage for it lacks feeding value in the first place, and fermentation adds nothing to it, on the contrary, fermentation always takes place at the expense of more or less of the feeding value. There are two conditions to be guarded against in putting up ensilage. We must not put up ensilage so mature that it will heat up too much, which you can detect by the discoloration of the ensilage; on the contrary we must not put it in so immature that it lacks feeding value. This can be readily detected by excess acidity in the cured ensilage. The advisability of putting up clover ensilage is questionable, putting it in before too ripe, cutting it up, and weighting would seem necessary. Then I doubt if it would compare in feeding value with good clover hay. I have tried cutting corn with a reaper, but in heavy corn it leaves it in such bad shape, I would just as soon cut by hand. With a tread power, three men and two teams, and short hauling, I can put in a ton in thirty minutes, and with less labor than I could handle that weight of dry fodder. Even distribution of the ensilage in the silo, and treading down well, especially near the walls, secures an even settling. This excludes the air, the only mystery about the curing of ensilage.

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*DISCUSSION.*

MR. FLEMING — What kind of corn do you raise for the silo?

MR. CONVEY — I raise a dent corn. I have visited all parts of the state except the southern, and I have never yet seen what I considered a perfect sample of ensilage from the larger varities of corn. I use what is called Litch's dent corn, which has heavy foliage. I put from three to five kernels in a hill. I have not tried Stowell's Evergreen.

MR. FLEMING — Why not use another variety that you may have corn at the same stage of maturity during the entire filling?

MR. CONVEY — It would be better but you can secure this by planting the same variety of corn at different times.

MR. GOODRICH — Evergreen sweet corn is an excellent corn to raise for fodder in the fall, but it makes ensilage that is more sour.

MR. POTTS — What length do you cut your ensilage?

MR. CONVEY — Seven eighths of an inch. I lift it with a carrier attached to the feed cutter. I have been using sweep power, but shall use tread power hereafter. I think the cylinder cutter is better than the balance wheel cutter.

MR. FLEMING — What do you cover with?

MR. CONVEY — I have put lumber on, then tarred paper and then cut hay, but this year I covered with grass without using the tarred paper and had more damaged.

QUESTION — How should ensilage be fed to get the best results from it?

MR. CONVEY — Always in connection with other feed. I am feeding clover, hay and bran.

MR. GOODRICH — Do you think you can carry more stock on a given number of acres by the use of the silo than without it?

MR. CONVEY — If you take the labor into consideration, I can. Still, I know that where they have made tests as to the comparative value of corn fodder, and corn ensilage, there don't seem to be anything in favor of the ensilage.

MR. GOODRICH — But it is impossible to get such fodder as they test with. I can carry more stock with the use of the silo, and it takes less work.

QUESTION — What is the cost of a ton of this ensilage in the silo?

MR. CONVEY — I would consider in the neighborhood of a dollar.

MR. GOODRICH — I have submitted that question to a great many in this state, and they figure it at 75 cents, 85 cents, 95 cents and a dollar a ton. I figure it a dollar.

SUPT. MORRISON — Can you make butter any cheaper by this silage than dry fodder?

MR. GOODRICH — I can, because I provide the feed cheaper; it cost me sixteen and two-thirds cents to manufacture a pound of butter before, and now it costs me thirteen cents.

MR. CHANDLER — What is the proper time to cut ensilage corn?

MR. GOODRICH — When the corn begins to glaze or dent.

MR. CHANDLER — Do you let it heat or fill right up?

MR. GOODRICH — Fill as fast as can.

MR. HYATT — Is silage of any value as feed to other stock?

MR. GOODRICH — I think it is. I have however, concluded not to feed ensilage to brood mares. I have fed it to work horses.

MR. ELLIOTT — What kind of a rack do you use in the field? Also, how do you fill and tread in the silo?

MR. CONVEY—I use a flat rack on low trucks. One man loading in the field, and another hauling.

QUESTION—In filling, do you believe it is better to keep the silo level or to keep it oval shaped and well tread?

MR. CONVEY — It would probably be better to keep it level and well tread.

MR. ELLIOTT — I have a rack for hauling that I constructed myself. I call it a low down-rack, it is about sixteen feet in the clear, and only about six inches from the ground. Two of us go into the field and each take a row, and as the team goes slowly along, we each throw into the rack until we have all the team can get out of the field with. We go directly to the cutter, which stands on a level with the platform of this rack, and we fill right into the silo, and tread it all over. Three of us, with three horses, put in ten to twelve loads a day. The team is changed from the rack to the power every time.

MR. ARNOLD—If you let the corn take care of itself as it comes from the carrier, won't it fall unevenly?

MR. ELLIOTT—I don't let it take care of itself in the silo. The man in the silo distributes it, and it is tread all over the whole surface. I think it should be kept oval in the center and well tread, or after it has settled it will tip away from the walls, and that lets down the air and makes a big loss. In building a silo a man wants to be careful that it is not larger at the bottom than at the top, if anything, it is better to have it a little smaller.

MR. ARNOLD—Isn't there danger from lateral pressure in that case?

MR. ELLIOTT—Yes, mine is only four inches in twenty-four feet.

MR. ELIASON—Do you fill your silo every day till you get it full?

MR. ELLIOTT—Yes, rapid filling, and I cover with green slough hay run through a feed cutter and put on one foot in thickness. We tread it for the first two days, but keep off from it after that time, because it begins to seal itself. It forms a slight mold, and if you tread after that, it breaks that mold.

MR. COLE—Wouldn't it be a great advantage to have a wide tired wagon in hauling that corn from the field?

MR. ELLIOTT — Most assuredly it would.

MR. ROE — How do you account for moldy spots or bunches in silos.

MR. CONVEY—I think it was due to putting in the corn with external moisture on it.

MR. FLEMING—I believe that would not hurt if the corn was in the proper stage of maturity. I have filled for six or seven years and always had rain on it, and it never moulded a bit.

MR. GOODRICH—Last year, in filling my silo there were several tons cut down when there was a shower on it, and it had to be put in wet, and there is no mold on it; it did not hurt it a bit.

MR. ROE—There are spots in my silo about as big as my hand.

MR. ARNOLD — I think that is occasioned by not filling continuously.

MR. FLEMING—It might be attributeable to the accumulation of some dry foliage.

JOHN RHODES—with a view of testing the value of silage, independent of dairying, we began feeding silage Nov. 24, 1890. It consisted of corn cut to one inch length, Smut Nose for early, and White Dent for late. It was grown for the corn. The tile drained portions would yield one hundred baskets of ear corn per acre. It was siloed when ripe enough to cut for ordinary field curing.

The results of feeding this silage to horses, cattle, sheep and hogs, were entirely satisfactory, except to the hogs. With swinish obstinacy they set their noses against it and refused to eat. We failed to convince them that it was good. Possibly the sight of a crib full of ear corn close by, warped their judgment.

The horses did not like it at first, a few oats were sprinkled on top and in about two weeks they grew very fond of silage. Two were work horses, one brood mare in foal, one driving mare and three colts. Their rations averaged daily 30 pounds of silage, 2 quarts oats, and as much slough hay as they would eat. They are now in fine condition. The average weight of four of them was 1447 pounds each, on April 14, 1891.

The cattle were fed nothing but silage and hay. Steers three year old this spring, ate daily 68 pounds of silage each, and 4 pounds of timothy hay. After three weeks of preliminary feeding two heifers and two lots of steers were weighed, Feb. 23. Thirty days later they were weighed again. The average daily gain of each animal was as follows: Heifers, 2 pounds each; first lot of steers, 4 1-10 pounds each; second lot, 2 8-10 pounds.

The sheep (146) were not weighed, but are in much better condition now than last November. They were fed 12 bushels (about 408 pounds) of silage daily and all the hay they would eat. Feeding silage to sheep in small grain troughs is a failure. They throw it out and waste it. Tight bottoms put in hay racks answer well.

Think we can obtain better results by feeding clover hay with silage than timothy hay. Our silage was spoiled on top and around the sides, and the surprise was that our cattle and sheep had no more sense than to eat the mouldy, loud-smelling stuff with as much apparent relish as the best. We intend to remedy this spoiling, or know why we can't.

Silage is heavy to handle, and the man who feeds 3,000 pounds daily, can use brains to great advantage in both filling and emptying his silo.

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SUPT. MORRISON—The farm institutes have from the very first winter's work in 1885-6 advocated the silo, not as thoughtless enthusiasts but by careful investigation, and by the feeding trials of some of our best feeders. The following issued in July by our Experiment Station brings the latest obtainable information of the silo down to date and we gladly insert it.



# THE CONSTRUCTION OF SILOS.

BY PROF. F. H. KING, Madison Wis.

Silo experience in the United States now covers more than ten years, and so far as the economy of producing silage and the advantages of feeding it are concerned, there appears to be everywhere, among those who have operated successful silos, a strong conviction that good silage is a superior and cheap feed; but the same experience is now fast demonstrating serious imperfections in the construction of perhaps a majority of existing silos in this country. Some silos have so rapidly deteriorated as to become utterly useless for the purposes for which they were intended inside of three or even two years, unless they are subjected to extensive repairs, while others have never successfully preserved the materials placed in them. With a view to obviating these difficulties in the construction of future silos, and of suggesting remedies for the defects of existing ones, a study of the actual construction and condition of silos now in use has been undertaken. It is the purpose here to record some of the facts observed and to make such suggestions as the present state of the study appears to warrant.

### *1. No. of Silos Examined.*

Thus far 93 silos have been examined, of which 70 are in Wisconsin, 6 in Michigan, 6 in Ohio, and 11 in Illinois. Of these, 67 are lined wholly or in part with wood; 10 are lathed and plastered with water-lime; 14 are stone, grout or brick, with cement facing; two are lined with metal, and one with tarred paper.

### *2. Kinds and Conditions of Wood-Lined Silos.*

Of the 67 silos lined wholly or in part with wood, 34 or more than one-half, showed some rotting at the time of the examination. The oldest of these silos have been filled only five seasons; seven are rotting at the end of the second filling, and one, which was relined at the end of three years, has the new lining rotting after a single year's use. This appears like a dark record for the wood-lined silos, but there is a brighter side when the subject is studied in detail.

We have found five varieties of wood lining now in use, as follows:

1. A single layer of matched boards, of which there are two; one of these is rotting where it comes against a beam in the barn, and the other has been used one year only. In the latter of these, the silage spoiled a foot in at the corners, and from two to four inches on the sides.

2. Two layers of common boards without paper and unpainted. But one of these was examined, and this was rotting in several places after three years' service. The silage had spoiled to a considerable extent in it, but it should be said that it was built of cull boards, many of which were worm-eaten and even spongy in places.

3. Two thicknesses of boards sepa-

rated by strips of furring laid upon tarred paper. Of the six silos containing this type of lining, their average age being 3.33 years, every one has rotted, two of them so badly as to require extensive repairs before the silos are suitable for service again.

4. One thickness of matched boards with paper on the studding. Thirteen of these silos have been visited, six of which, with an average age of 3 years, are in good condition still, while seven with an average age of 3.43 years, are rotting more or less.

5. Two thicknesses of boards with paper between, nailed closely and firmly together. There are 45 of these silos, 26 with an average age of three years, in good condition, while 19 with an average of 3.4 years are rotting to some extent.

The rotting which has occurred in most of the cases noted is by no means general and the conditions under which it has occurred may be thus stated:

1. Rotting where there has been inadequate general ventilation,— eight cases.

2. Rotting where stone walls have been faced with wood,— eight cases.

3. Rotting where boards came against beams or sills,— twelve cases.

4. Rotting where spoiled silage is left piled against the boards,— four cases.

5. Rotting where dirt is piled against or lies behind the lining,— four cases.

### *3. Importance of Thorough Ventilation.*

I believe that the rotting in every case we have thus far observed in the walls of wood silos is attributable to imperfect ventilation, and that it might have been greatly delayed if not entirely prevented by different methods of construction.

Wood kept perfectly and continuously dry, or perfectly and continuously saturated with liquids which do not act chemically upon it will resist decay for generations; while almost any natural wood, containing a suitable amount of moisture and possessing the right temperature, may rot in a very brief period provided only that there be present in it the living spores or germs which develop and multiply at the expense of the wood tissue.

The ordinary kinds of wood-decay are processes of disintegration due to forms of life which develop from spores and do their destructive work where conditions are favorable, that is, where the temperature is right and the wood is, for considerable intervals of time, neither too wet nor too dry. This being true it is evident that wood-lined silos should be so constructed that all lumber against which the silage does not lie, shall be continuously too dry to permit of decay, while the lining itself should be permitted to become dry, and remain so, as fast as the silage is removed from it. These conditions may be maintained in all comparatively dry climates, I believe, by adopting modes of construction which insure very thorough ventilation both of the silo pit and within the silo walls immediately behind the lining; but it may be seriously questioned whether in damp climates, where the shingles of houses are largely moss-covered most of the summer, a simple wood lining can last long in any solo.

### *4. Paint For the Wood Linings of Silos.*

The linings of wood silos have been treated in various ways to render them less liable to rot, and the following have been observered:

1. Linings without paint of any kind.

2. Linings painted with hot coal tar.

3. Linings painted with coal tar dissolved in gasoline.

4. Linings painted with hot coal tar mixed with pitch.

5. Linings painted with pitch alone.

6. Linings painted with linseed oil and red ochre.

7. Linings painted with linseed oil alone.

As far as can be deduced from a study of the cases visited, there appears to be very little if any advantage derived from the use of the paints mentioned. Some of the very oldest wood-lined silos I find unpainted, and at the same time perfectly sound, while on the other hand the silo having apparently the best coating of paint has rotted more than any other and inside of three years.

If a perfectly impervious coat, which would remain so, could be applied to the wood lining, this would, without doubt, be of great advantage; but the coats mentioned, applied as they have been, leave innumerable places for the silage juices to enter the wood, and when this is the case there are two ways in which the paint may actually hasten the rotting rather than retard it, thus:

1. By preventing the boards, in places, from becoming wet enough to keep the fungi from growing there while covered by the silage.

2. By holding moisture in the boards long enough after the silage is out to allow the spores to develop and destroy the wood.

#### *5. Stone and Grout Silos.*

We have examined fourteen silos which are stone or grout and twenty-five which are stone or grout below and wood above. The masonry of nearly all of these silos is plastered with one or more coats of some variety of water-lime or cement, and where the work is well done the great majority of the testimony goes to show that the silage is just as good in contact with the masonry, or even better than against the wood.

The water-lime coating, however, is not permanent. Both the acetic and lactic acids of the silage juices act vigorously upon the lime, in all varieties of cements; dissolving it out and leaving the mortar a layer of porus sand, which is easily and deeply scarred with the fork in removing the silage and which crumbles and rubs off under the hand. When this condition is reached, the layer of cement becomes saturated with the silage juices, and if the walls are not protected from frost, it freezes and cleaves off; where this is not the case, in the older silos, the absorbed juices undergo a change, which results in the development of a very strong and disagreeable odor, which I have rarely detected in the wood silos. The quantity of juices absorbed by the porous cement is enough to develop a thick layer of mould, sometimes covering the entire walls in the poorly ventilated silos and this, on drying, cracks and rolls up as mud does in the sun. While it is true that the acids of the silage decompose the cement of the stone silos, still the life of a single heavy coat, well put on and protected from frost, appears to be at least ten years, and with a yearly white-washing with pure cement, I have no doubt that a single coat of plastering might last twenty to thirty years.

Where the walls of stone silos have been left rough and uneven through insufficient pointing or not plastering them, the settling of the silage develops air spaces against the walls, which result in more or less silage spoiling; this fact coupled with another, namely, that

the earlier stone silos were comparatively shallow, has been, in my judgment, the chief cause of unfavorable criticism of these structures. The only serious objection I can urge against a well built stone silo is its relatively high first cost.

*6. Lathed and Plastered Silos.*

Of this class of silos I have visited ten; one has been filled four times, three, three times, and the remainder only once or twice. No one of these silos could be pronounced unqualifiedly sound at the time of my visit. Indeed one had been relined with wood after two years' service; one was being replastered in places, and three others had some of the plastering off, two of them large areas, when they were examined. They all showed cracks and the disintegrating effects of the acids described under the stone silos. There are several very serious objections to this type of lining:

1. The springing of weak silo walls, the treading and packing of the silage tend to break the clinches and loosen the plastering.

2. Careless use of the fork in removing the silage will necessarily perforate and break away the cement.

3. The softening effect of the acids renders the coat liable to destruction from freezing and permits the silage juices to wet the lath and woodwork behind, and by holding moisture against them after the silage is removed, increases the danger of rotting. In the silo which had been relined with wood it was stated that the boards were damp when the plastering was removed a month after the silo had been emptied and that some of the boards were already rotting. The silo which had been in use four years had been whitewashed with pure water-lime each season, and this appears to have nearly neutralized the acids and thus protected the lining, for the only softening in this case was near and at the bottom. Three of this class of silos visited are round, thirty feet in diameter and plastered with hair mortar to which cement was added when it was applied. Here the greater rigidity of the silo walls, the arched surface of the mortar and the hair in the clinches all conspire to give greater permanence to the lining than in the rectangular silos, and I have no doubt that with very thorough ventilation both of the silo pit and of the walls behind the lath, together with a yearly application of cement whitewash, the lining may last a long time.

*7. Metal, Shingle and Paper-Lined Silos.*

We have at the Experiment Station two silos lined with metal, one with sheet-iron and the other with roofing tin. They have each been in use one year, and in my judgment are not likely to prove satisfactory. None of the available metals are in themselves proof against the acids of the silo, and it is difficult to coat them in such a way as to entirely shut off the acids. The two varieties of paint used on the linings mentioned came off quite generally and the rusting of the sheet-iron is very noticeable. Roofing tins are now mostly coated with lead, and its compounds are poisonous. I have found it very difficult to coat sheet-iron, even with coal tar which the acids do not attack, so as to protect it on account of the small cavities in the surface, containing air which expands with changes of temperature and blows out, leaving minute pores through which the water and acids enter and eat under the rest of the coating. There is less trouble of this sort with tin,

but in either case the fork is certain to cut through the paint and expose a fresh surface to the action of the silage juices; and besides neither of them can be applied for less than $50 per thousand square feet.

I have seen but one paper-lined silo, and it is very unsatisfactory. The paper was held in place by cleats extending both up and down and horizontally. The paper was badly warped and much torn. The cleats interfere with the settling of the silage and tend to develop air spaces which cause the silage to spoil on the sides.

The two shingled silos were in a fair state of preservation, and the silage is reported to have kept well in them. In these cases cull shingles had been used at 60 cents per thousand.

Such a lining is necessarily less perfect, and I believe, not as lasting as plain boards, and when good shingles are compared with good lumber, the lumber is cheaper.

*8. The Form and Dimensions of Silos.*

An ample depth of the silage is one of the first requisites of its keeping. I have visited silos 30, 34 and 36 feet deep, and all the evidence goes to show that the best silage and the least absolute waste is found in deep silos, while other conditions being the same, the poorest silage and the most waste occur in the shallow ones. My conviction is that the best results can hardly be secured with a depth less than 24 feet unless very heavy and careful weighting is resorted to. The importance of depth increases when clover or other loose-lying material is cut in, and such materials should, as a rule, be covered with a considerable depth of corn to insure closer packing and a more complete expulsion of entangled air.

In form the silo should be either round or as nearly square as it is practicable to make it, because these forms give the greatest capacity with the least amount of side exposure. The long, narrow silos are needlessly wasteful, both of silage and of lumber. I have visited one silo 12 x 27 feet, only 12 feet deep, and another 16 x 48, 22 feet deep. Now a silo 32 feet square will have the same amount of side exposure as the one 16 x 48, and for the same depth, will hold just one-third more; while the same amount of side in a round silo will enclose more than two-thirds more silage and will require much less lumber to build it, because 2 x 4 studding may be used, the siding and lining acting as hoops giving the needed strength.

*9. The Importance of Feeding From the Top and the Use of Partitions.*

In the construction of silos, careful attention should be paid to the area of surface exposed in feeding the silage. Silage wastes much more rapidly when fed from the sides than from the top, and since the most economical construction demands the largest possible feeding surface, it follows that the feeding should be, in general, from the top.

The proper horizontal area of the feeding pit depends upon the amount of silage fed daily and the rate at which silage becomes seriously injured when exposed. I have not been able to gather facts enough to settle this important point. The spoiling is certainly more rapid in the shallow than in deep silos, and more rapid when corn or clover is put in whole than when cut, because it is impossible to feed the surface down as evenly and keep it as smooth. My impression is that the silage should be lowered at least two inches daily, and that three would be better. Taking three inches as the depth

fed daily, forty as the number of animals, 150 days as the feeding period, and 1.5 cubic feet as the amount fed to each animal daily, a round silo 17.5 feet inside diameter and 37 feet deep would be required. The same conditions would also be met by a round silo 22 feet inside diameter 24 feet deep with a partition through the center.

Where all the silage can be fed conveniently from one point and a large amount of silage must be stored, one silo with partitions is not only much cheaper, but better than separate structures because the additional corners cannot admit air from the outside when the pits are full and the round silo with partitions makes less corners than the rectangular one does.

Two inch partitions give ample strength where the filling takes place on both sides at once. And if it is desired to fill one pit faster than the other, temporary braces may be placed in the empty pit and removed as it is filled I believe that two thicknesses of boards with paper between make a better partition than the two inch plank which appears to be more commonly used.

*10. Smoothness of Silo Walls Essential.*

Whatever tends to the expulsion and exclusion of entangled air must conserve the silage, and whatever tends to leave or form cavities in which air can lodge in bulk, experience shows, leads to spoiled silage. Cross-rods, overhanging ledges and projecting stones should be avoided as they hold up the silage, forming cavities into which air collects, enabling the molds to grow.

*11. The Covering of Silage.*

When the feeding of the silage does not begin very soon after the completion of the filling, a good covering lessens the waste. I have found the following practices in regard to covering:

1. Some do not cover at all, and have six to twelve inches of waste.

2. Some have used straw with no gain and possibly greater loss.

3 Many use green marsh hay cut on, and sometimes wet, with good results.

4. A few use chaff with good results.

5. One has used boards covered with eight inches of dry earth, which is used afterward in the stables as an absorbent. Silage keeps well.

6. One used straw and weighted with stone with poor results.

7. Some use cut marsh hay covered with plank, the cracks between plank covered with boards, and the whole weighted with stone. Little loss except at edges and corners.

8. Others use a layer of cut straw, then boards, then tarred paper and boards again. Keeps perfectly except at edges and corners.

9. Still others have used first paper, then boards, and these weighted with stone, with good results.

The testimony in regard to covering is quite discordant. Some claim good results with a given method, while with others it has failed. Some have good results one season, and very different results another with the same method. We need much more positive knowledge on this point than is now available.

*12. Protection Against Rats.*

Nine of the silos visited have been invaded by rats. They enter usually by burrowing under the foundation walls, coming up inside even where cement has been used. But in some cases they have found entrance to the dead air spaces, then cut holes through the linings, usually at the corners. Their de-

structive effects result from the admission of air to the silo, and when it is said that one man reports killing twenty-six rats in a silo, the possibilities of damage to silage by this nuisance can be appreciated.

The surest safeguard against them appears to be covering the bottom of the silo with a layer of small stones or grout, before the cement is applied. When the cement is applied directly upon the ground the action of the acids soon softens it to such an extent as to permit the rats to penetrate it without difficulty.

### *13. Protection Against Freezing.*

If we should be guided in the construction of silos by the general testimony in regard to the liability of silage freezing, the statement would be that very little attention need be paid to this point.

It must be borne in mind, however, that most of our silo experience has been gained during the past three years, when the winters have been exceptionally mild. Those owning older silos do speak of silage freezing, and some of the stone silos testify to the destructive effects of frost. The general verdict is that the freezing, so far as silage is concerned, is more an inconvenience than a serious loss. When the frozen silage is mixed with the rest it quickly thaws, and is apparently relished as well as if it had not been frozen. All types of cemented silos must be built frost proof to prevent the cement from cleaving off; but with wood silos the construction required to preserve the silage and to protect the frame from weather, appears to be sufficient to prevent any serious freezing during all except protracted extremely cold weather.

### *14. Construction of Wood Silos.*

At present prices there is no available material on the market which can compare with wood in cheapness of first cost; and if a mode of construction can be devised which will insure permanancy to the frame work, and at the same time give an effective service of, say, ten years to the lining, the essential demands of a material for silo-building will be met by it. The fact that we have perfectly sound all wood silos of five years' standing which embody only a portion of the principles essential to long life is encouraging for this type of construction. I believe there need be no question about the entire adequacy of the wood frame and the covering outside, above ground, and I have great hopes for the wood lining.

In the construction of a wood silo it is important to have in mind the conditions essential to durability, and some of them will be here stated:

1. Only sound and well seasoned lumber should be used. I have mentioned the case of a second lining rotting in a single season. In this case the new boards were placed directly against those which were rotting, an equivalent to adding wood to fire; and when unsound lumber is used it is very likely to contain either the spores or living fungi which only require the dampness of the silo and its warm temperature to carry forward their destruction. Sapwood, too, is much more subject to rot, because it contains more food upon which the fungi subsist; hence the sappy ends of studding should be turned up and the sappy edges outward. The soundest boards should be reserved for the lining and the very best placed at the bottom.

2. Whenever the conditions are favorable for the rotting of silage there it is quite possible for the silo lining to rot also, as my observations have shown,

and since ample depth insures better silage, it may also be expected to better preserve the lining. I have not met a man who unqualifiedly says his silage is as good in the corners as at most other places along the sides, hence I feel that rotting of the linings of these places is likely to take place, and for this reason and because it is stronger and cheaper, the round form, wherever it can be used, is preferable to the angular silo.

3. The large number of observed cases of rotting where dirt, stone walls, beams or sills hold dampness behind the silo-lining, coupled with the cases of rotting which have occurred where there has been imperfect general ventilation, show that perfect ventilation on both sides of the lining is one of the first essentials to its preservation, hence, horizontal studding and the placing of linings directly against beams or sills should be avoided as well as the lining or stone walls with wood.

*Silo Linings.*—In the majority of cases the best results have been associated with the lining consisting of two layers of boards with tarred paper between them, but it does not appear essential that either should be matched; they should be of uniform thickness, however, and the narrower widths are best. On account of the conditions which work for and against the rotting of linings I believe a still more effective and durable lining may be secured by painting both layers of boards *on one side only with hot coal tar boiled until it is not sticky when cold.* The tarred sides should be placed *face to face* in the silo, tarred paper between them, and I would urge the painting of the paper with cold coal tar after it is in place but *no faster* than the inner lining is put on. The coating of the boards may be readily done by boiling the tar in an iron kettle three feet in diameter letting one man slide the boards across the top while another paints them with a well worn broom. The tar should be laid on smoothly, and the boards placed horizontally to cool. After boiling the tar down to the proper consistency, there should be enough fire only to keep the tar hot. A wide board should be at hand to throw over the top of the kettle to smoother the flames in case the tar should take fire from overheating.

It would be less trouble, perhaps, to put on the first layer of sheeting and paint it, in place, with coal tar boiled until it is as thick as it will spread readily when cold. By painting the first lining and placing the paper, and painting this just before the second lining is put on, a very impervious wall must be secured. Such a treatment of the lining would prevent the outer layer from becoming damp, allow the inner to dry more quickly after the silage is removed, besides rendering both more impervious to air, and it would seem, must be a great improvement at small expense, but only a trial for a series of years can positively settle the matter.

***The Sills.***

These should rest on a good stone wall, well bedded in mortar after having their under sides and inner edges painted with coal tar, as described for the lining, and they should be everywhere at least six inches above the bottom of the silo inside, and eight inches above the earth outside.

In the rectangular silos, where they are deep, the sills must be anchored with iron rods as shown in Fig. 4, but in the round silo this is unnecessary. Fig.

4 shows how the studding should be placed on the sills and beams, if in a barn, to insure ventilation.

### 15. *The Construction of Stone Silos*

I have visited some very excellent stone silos in Dodge county, Wis., one of which is 14x24 inside, and 30 feet deep 22 feet above ground. It is covered outside with dimension boards battened, extending up and down and nailed to 2x4 studding, held in place by hooked pieces of band-iron laid in the walls; its cost was $500. There are several silos built on this general plan in the same locality, one of ten and another of seven years' standing, which have not frozen, They keep the silage excellently, but the cement is fast softening.

### 16. *Cost of Three Types of Silo Compared.*

We give below the cost of a thoroughly built rectangular silo, and of a round one having the same capacity and depth as the stone one whose cost was $500.

In these bills the prices of materials have been set at the present local rates here, and the cost of carpenter labor has been placed sixty-five cents per M. above what I know similar work to have been done for where the carpenters were boarded.

RECTANGULAR SILO, 180 TONS.

14x24 inside, 30 feet deep.

| | |
|---|---|
| Foundation 13.44 perch, at $1.20 | $16 13 |
| Studding 2x12, 28 ft., 4,704 ft., at $20 | 94 08 |
| Sills, etc., 2x10, 26 ft., 206 ft., at $19 | 4 94 |
| Sills, etc., 2x10, 16 ft., 426 ft., at $14 | 5 96 |
| Rafters, etc, 2x4, 20 ft., 400 ft., at $16 | 6 40 |
| Roof boards, fencing 450 ft, at $15 | 6 75 |
| Shingles, 5 M., at $3 | 15 00 |
| Drop siding, 8 inch. 2,779 ft., at $16 | 44 46 |
| Lining sur. fencing, 4,266 ft., at $15 | 63 84 |
| Tarred paper, 426 lbs., at 2c | 8 52 |
| Coal tar, 1 barrel | 4 50 |
| Painting 60c. per sq | 15 00 |
| Nails and hinges | 10 00 |
| Cementing bottom | 5 00 |
| 18¾ inch bolts, 18 inches long | 2 70 |
| Carpenter labor at $3 per M. and board | 41 16 |
| Total | $344 44 |

ROUND SILO, 180 TONS.

20 feet inside diameter, 30 feet deep.

| | |
|---|---|
| Foundation, 7.5 perch, at $1.20 | $9 00 |
| Studs 2x4, 14 and 16 ft., 1,491 ft., at $14 | 20 93 |
| Rafters 2x4, 12 ft., 208 ft., at $14 | 2 91 |
| Roof boards, fencing, 500 ft., at $15 | 7 50 |
| Shingles, 6 M. at $3 | 18 00 |
| Siding rabbeted, 2,660 ft., at $23 | 61 18 |
| Lining, fencing, ripped, 2,800 ft., at $18 | 50 40 |
| Tarred paper, 750 lbs., at 2c | 14 80 |
| Coal tar, 1 barrel | 4 50 |
| Hardward | 6 00 |
| Painting, 60c. per square | 13 20 |
| Cementing bottom | 5 00 |
| Carpenter labor at $3 per M. and board | 33 17 |
| Total | $246 59 |

The three silos are outside and wholly independent structures except the entrance and feeding chute shown in fig 2, which connects with the barn. This method of connection for outside silos, while a little more costly, I feel confident, is much the best in the long run.

There is no practical difficulty in filling a silo 30 feet above the cutter, I have visited one filled 28 feet above, and several 24 feet. The carrier, of course, must be longer, but the increased labor is relatively small. A filling window at a lower level may be and is in some cases provided, to be used at first.

### 17. *Building a Good Silo by Degrees.*

It is much better, and cheaper in the end, to start with the intention of building a thoroughly good silo, and it is possible to do this when money enough cannot be commanded at the outset. In building the round silo referred to, costing $246.59 it may be put up and used one or even two years before it is completed. To illustrate, in this case, the siding, outside paper, painting and cementing the bottom may be deferred one or even two years if really necessary, the only serious inconvenience possible being the freezing of the silage. This would diminish the immediate cost, $94.76, making the first year's expense $151.83.

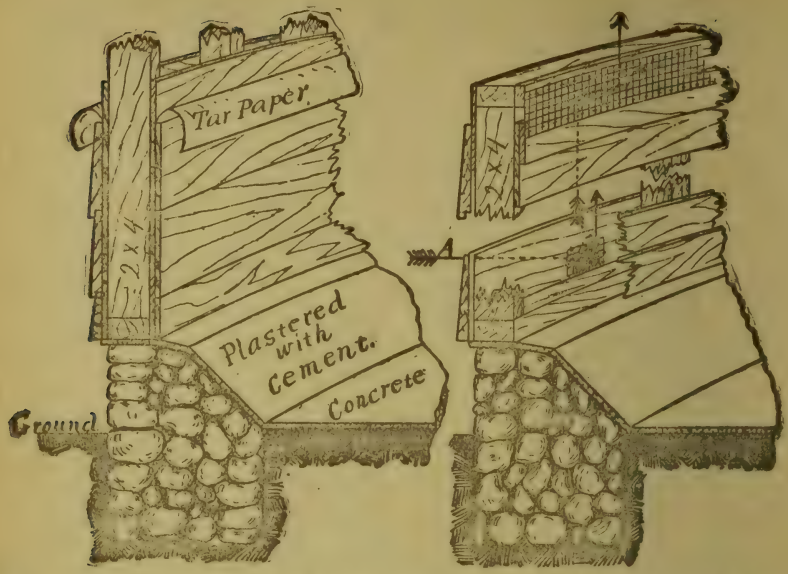



FIG. 1.—Showing the construction of all-wood round silo. Sills 2x4's cut in sections on a radius of the silo circle, bedded in mortar and toe-nailed together. Plates the same, spiked to tops of studding. Studding 2x4's one foot apart. Short lengths may be used lapped to get the depth. Sixteens and fourteens will give a silo 30 ft. deep. Lining made from fencing ripped in two. Outside sheeting the same. Siding for silos under 28 feet, outside diameter, common siding rabbeted; for silos more than 28 ft. outside diameter, common drop siding or ship lap may be used. A, shows ventilators between studding. Auger holes are bored at bottom between studding, and the boards lack two inches of reaching plate at top, inside. Both sets of openings are covered with wire cloth to keep out vermin. There should be a line of feeding doors from top to bottom, each 2 or 3 ft. by 5 ft., and about 2.5 ft apart.

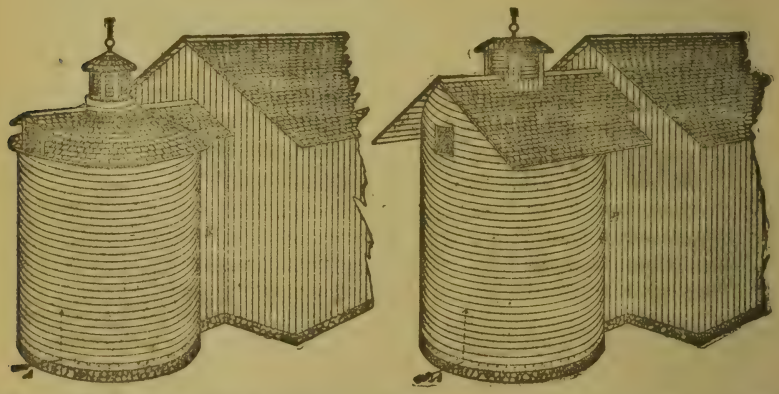


FIG. 2.—Showing two methods of roofing round silos and the manner of connecting them with a barn. A A shows where air is admitted between the studding to ventilate behind the lining. B B, the feeding chute. C C, filling window. The cupola is essential for perfect ventilation.

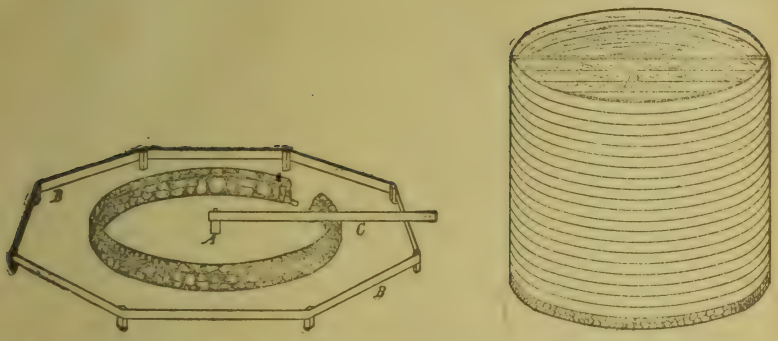



FIG. 3.—Showing method of laying and leveling foundation of a round silo, and a round silo with a single partition. A, center post with top of proposed wall. B B, straight edge boards nailed to stakes driven in ground. C, straight-edge fixed to turn on a pin at A. B B, are all nailed level with top of post A. D, partition in round silo. It may be placed so as to come in the middle of the single line of doors, letting the same doors answer for both sides.

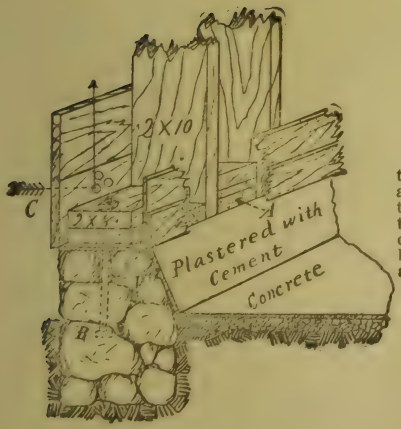



FIG. 4.—Showing the construction and ventilation of the walls of a rectangular silo. The sills are two inches narrower than the studding, to leave air space between sills and lining. A, is two inches of mortar made by stirring sand into coal tar, boiled until it is hard when cold. B, is bolt anchoring sill to wall, placed about four feet apart. C, ventilator between studding.

*18. Suggestions Regarding the Repair of Existing Silos.*

The matter of ventilation is the first point requiring attention. This can be secured in most of the silos which have carefully constructed dead air spaces, by removing the upper board next to the plate or by sawing out sections between each pair of studding. These openings may be covered with netting as shown in Fig. 1, if desired.

Where paper has been placed against the side of the barn and strips of furring used to carry the lining, I believe the best way will be to remove the lining, take of, the strips of furring and apply sound lining directly to the paper, putting on new paper where the old is injured.

Where stone walls have been faced with wood and the lining is rotting, the wood should all be removed and the wall plastered, so as to be a little more than flush with the lining above, and those who have walls which set back under the lining above should face them out flush. A jog outward into the silo below is often admissible, but the reverse never.

Where only small patches of lining are rotting, it may be best to cut out the rotting wood and paint the edges well with carbolic acid or creasote oil to kill the germs. Then fit in a block and nail over it a piece of tin and paint this with a coat of hot thick coal tar.

Where dirt has been banked against the lining, it should be removed and the bottom lowered enough to let the boards become dry when the silage is removed.

Rotting silage should not be allowed to remain in the silo. When it must be left for a time, it should be thrown into the center away from the walls.

The cases of rotting against sills and beams are the most difficult to meet. It is, of course, important to prevent the rotting from extending to the sills, and in some of the cases this may be done by providing ventilation behind the lining and then removing the lower two feet of lining, facing each stud with a wedge shaped strip about an inch thick at the bottom, letting it extend downward across the sill. Then, when the lining is restored, and the wall below made flush with it, the ventilation will help to protect both sill and lining.

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*DISCUSSION.*

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QUESTION — Is adamant a good material for plastering silos?

I have examined this material with reference to the action of acid upon it, and find that it is not acid proof; it is attacked by the acetic acid of silos and more vigorously by muriatic and sulphuric acids, each rendering it softer and less impervious to water and air. I am not certain, however, that it will not prove as satisfactory for the silo as any of the cements, for in the laboratory it is acted upon less rapidly than most of the cements, but I know of no actual test in the silo.

QUESTION — In painting with coal tar, which is best, to thin with gasoline or put on hot?

My observations convince me that simply painting plaster, brick or wood surfaces with coal tar, or "gas tar," thinned in gasoline does not completely fill the pores of the materials to which it is applied.

I have immersed dry brick in boiling "gas tar," and then, after they became cold, suspended them in water. Treated

in this much more effectual manner, they increased in weight nearly as much as other brick not treated, but of course, much more slowly. When the "gas tar" is thinned with gasoline it penetrates the surfaces more deeply, but leaves all of the larger pores and cracks open, acting much as oil does which has no paint in it to make it thick.

On the other hand, if the "gas tar" is boiled until it is not sticky when cold and then applied hot, it adheres perfectly and closes up all the large and small pores and holes alike, making the surface so treated, almost completely air and water tight. This treatment, however, cannot give a perfect lining to a lathed and plastered silo. My observations show that the springing and jarring, incident to filling and emptying silos, are almost certain to break the clinches on the lath, and allow the plaster to fall off. Such a treatment will certainly make a much more effectual lining as long as it lasts, but aside from the danger of flaking off, the fork may be thrust through the coating of tar at any time, thus exposing a place for the juices to act. When this coating is applied to the stone plastered silos, and to brick lined silos, I feel that it must prove very effective if care is taken to patch up such breaks as may occur from year to year with the use of the fork in emptying the silo.

QUESTION — What is the best shape for a silo?

For preserving the silage in the best condition, for cheapness of construction, for strength and for facility in filling, I regard the cylindrical form far ahead of any other, and where a separate structure is to be built, in most cases this form will be found the best.

QUESTION — What is the best depth for a silo?

If it is practicable to avoid it, no silo should be less than 24 feet deep.

QUESTION — Is it necessary to build the silo walls very strong?

Yes. The pressure might be unusually large where the filling is uneven, and especially where the silage is dropped constantly in the center and only distributed once a day. In such cases its center is highest and the silage tends to slide outward against the sides. We used a strong side pressure upon the walls to prevent the silage from shrinking away, leaving space for air to circulate.

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# HOW I FEED DAIRY COWS.

By C. P. Goodrich, Ft. Atkinson, Wis.

*Intelligent Feeding.*

I believe that the true way to feed dairy cows for profit—and profit is what we are all after—is to feed the proper food for the production of milk, to the full capacity of the animal's power to digest, assimilate and manufacture these foods into milk. This way of feeding or "foreing," as some term it, is objected to by some on the ground that this cow machine will sooner be worn out. Suppose for a moment that position is correct. Is there a sensible man here who would

think of running any other machine that takes a certain number of hands to attend, and a certain amount of power to get up speed enough to do any work at all, who would run his machine at one-fourth or one-half its capacity, for the sake of making his machine last a little longer.

***Profitable Feeding.***

Then suppose you had a steam thresher that could do first class work up to 1,500 bushels a day as its limit. Is there any man here who would think it economy to run such a machine with only steam enough to thresh 500 bushels a day for the sake of prolonging its life a year or two. It would take nearly as much fuel to get up steam, the same engineer, the same feeder and other attendants, but his machine might last 11 years instead of 10. Such a man you would unhesitatingly pronounce foolish; but in my opinion he would be wise indeed compared with the man who would run his cow machine at anything less than its full capacity. The cow, unlike the thresher, improves by use, for animal nature has the faculty to adapt itself to the uses to which it is put, up to a certain limit. In other words, the more and better milk you manage to make a cow give, the more and better milk she *can* give until that limit is reached, as you develop her capacity to do so, and this improvement will be, in a measure, transmitted to her progeny, so that the heifer calves of a cow will be better than those produced before such development has taken place. In that way each generation will be better than the preceding one. These facts I have demonstrated to my satisfaction in my own experience. Others have done the same thing and I cite you as very high authority on this subject Prof. E. W. Stewart. You will find the subject quite fully treated of in his work on "*Feeding Animals.*" But it is not true that high feeding of cows if judiciously done, so as not to impair their digestive organs, will tend to "wear out the machine." More cows are "worn out" by under feeding than by high feeding. I have had them last with high feeding, with scarcely any diminution of their powers, till they were 15 years old.

***Milk Producing Food.***

To make the greatest profit in dairying the cow should be fed and managed in such a way as to make her consume as much as possible of good milk-producing foods. To do this she should have the greatest possible variety of foods. Her appetite — her likes and dislikes — should be catered to as much as can be consistently. In summer her pasture should contain a great variety of grasses. And when my cows are put in the stable to milk twice a day they have some good clover hay, and they never fail to eat some, no matter how good the grass in the pasture is. They also are fed in summer, except some of them that are dry a short time at that season, all the grain — corn and oat meal or bran — they will eat, which, of course, is not nearly as much as they eat in winter. In winter they have as great a variety of fodder as possible each day — clover and meadow hay, corn fodder and straw, with a grain ration, in two feeds of from 12 to 15 pounds. I observe the greatest regularity possible in feeding, having the same kind of food given at exactly the same time each day, so that they are never worried or disappointed by having one kind of food thrust before them when they are expecting another kind.

*Economy.*

To produce milk as economically as possible I try to provide the necessary elements in that food which will cost the least, having due regard all the while for the likes and dislikes of the cow herself, for I believe her pleasure should be consulted as much as the housewife consults the pleasure of her family when providing food for them. If oats are cheaper than corn meal and bran, I feed oats mainly for a grain ration; but if two tons of oats will buy three tons of bran, then I make the exchange. Chemical analysis seems to indicate that good clean wheat bran is fully as good as oats for milk production, but my observation seems to prove that oats are, at least, a little better. Corn is usually a very cheap grain food, but it is too carbonaceous and should not be used for more than about one-third of the grain ration. Corn ensilage made from well eared corn is the cheapest food I can provide for my cows, but it is not of itself a perfect ration but needs to be balanced up with bran or oats and clover hay.

*Carefulness is Profit.*

I have been trying to tell you how I feed my dairy cows, but I am sensible that I have failed to give more than a slight general idea of it, for each cow has her own individual capacity which differs from every other cow, which must be studied by close observation and acquaintance, before the feeder is able to do the best that can be done. I never could tell anybody just how to feed my cows. I never dare give instructions to have as much grain fed as I feed, for no one who is not intensely interested in it and in full sympathy, I might term it, with the cows, will be able to feed just right. Some cow might be fed a little too much grain and it not be observed until she refuse to eat, when it will probably be too late—her digestive organs permanently injured. When I wish to instruct anybody how to feed my cows I have to go, taking him with me and *show* him, and show him more than once, too.

I will see what I can do to further give an idea of how I feed. If I only had my cows here I believe I could show you. If I only had you down there it would do as well, and I will have to take you there in imagination.

You may stay just as long as you have a mind to, if you only treat the cows well. Now, just imagine yourselves all down at my house three years ago, before I had a silo, because silos are not very plenty yet, and I want you to know how I fed them then. You will have to get up at half past five in the morning, and go with me to the stable. I shall take some good clover hay and put it in the manger. You observe that I give more to one cow than I do to another. I know just about how much they will eat, and I want to give each cow all she will eat up without leaving any to breathe on.

*Order and Regularity.*

After the clover hay is fed the milking is done. Every milker has the same cows to milk each time. He commences in the same order, and milks about the same rate, never hurries and never lags, but as near as possible every time alike. If they are going to talk at all they must talk all the time. Sometimes we have had a boy and a girl out there milking. Now then if they are going to do any sparking, they have got to keep it up, but as a rule that does not work very well. The best milker I ever had was a very musical fellow. He used

to sing, but he had a different tune for each cow. Now if he should have changed his tune and sung Old Hundred to the Yankee Doodle cow you see the motion of his hand would have been slower, the milking would have been different, the cow would not have been pleased at all, would not have given so much milk, and it would not have been as good. After the milking is done I take a basket with some grain which is ⅓ bran, ⅓ ground oats and ⅓ corn meal by weight, and I come along to the cows. You will have to allow me to forget that I am here. I am going to be down there and I shall talk to my cows just as I do there. Now here is Beauty. "Beauty, you are a pretty nice cow. I don't just exactly like you because you are a little bit dainty, you can't eat quite enough to suit me. You don't act very hungry, you have been having six pounds of grain at a feed, here goes five pounds, that will do for you now." The next one I come to is Mollie. "Well, Mollie, you act as though you could eat; you are a fair cow, but there is considerable shorthorn about you, you are taking on flesh; that won't do, but then I cannot starve you, I can't do that, here she goes, seven pounds, you can eat that, and Mollie you will go to the butcher in the spring. If you want to live with me you musn't put your food into flesh."

Next is Jane. Jane acts hungry, she wants more than I will give her. The fact is she has been giving milk about ten and a half months and she has got to dry up. "Jane, I am sorry for you I can't give you much. If I give you all you want you will have the milk fever when you come in; be reasonable and satisfied." Now, here is Lizzie. How good I feel every time I see Lizzie.

"Lizzie, you act as though you were most starving; what ails you? I have been feeding you 9 pounds at a feed twice a day and yet you don't act satisfied. You are all right, you make good use of it. Here goes two measures. I don't know but there's ten pounds. Never mind, you shall have as much more as this at night if you want, you are making good use of it." I want you to take a look at this cow and see how bright her eyes are. She has a long face and strong jaws, she can crunch an ear of corn down with perfect ease.

"Oh," but you say "How sharp her backbone is." That is true; it sticks up six inches. But come around here and see what an immense girth she has; such a capacity for eating; how broad she is. "Yes," you say "how her hip bones stick out." I tell you those are points of beauty about this cow. Her hams are thin, there is a place for an immense udder, and she has one. "I don't see as that is much of an udder." Yes, but I have just milked twenty-one pounds of milk, and that milk has one and a half pounds of butter in it. Think of that. Now, this Lizzie cow is the delight of my eye. But you say. "Is she hardy?" Ain't a cow hardy that will make 3 pounds of butter a day? But she can't stand hardship, she can't stand cold; the fact is I don't believe she has ever been where it was cold enough to freeze. In September as soon as there are frosty nights she and all the rest of them are put in the stable, and kept in nights if the weather is cold or stormy. I let them out to drink in the day time, but they drink and come right back. Lizzie will be just crazy to get back to the stable. This feeding and milking is all done before breakfast you understand. After breakfast, say eight or

nine o'clock we go and let the cows out to drink and they drink pure water that is warmed up, to say, fifty or sixty degrees, so that the chill is off, and if it is cold weather only a few are let out at a time so they don't have to wait. If it is pleasant they stay out in the yard a little while and have some marsh hay. At noon they are given a good feed of cut corn fodder, and at night about four o'clock they are turned out to drink again, and what is left of this corn fodder is thrown out for bedding, and by the way, every time they are turned out there is a good lot of straw put in so they have good bedding all the time. The last thing at night the mangers are filled up pretty well with good clover hay. All this is gone through with every day until they go out to grass.

They have good pasture and all they want to eat besides, and they will eat just about half as much grain in the summer as they will in the winter, except those cows that are nearly dry.

*DISCUSSION.*

MR. CONVEY—How do you salt?

MR. GOODRICH—I intend to let them have what they want, all the time. I don't want it mixed with the food so that they get more salt than they want. Now, I give ensilage twice a day instead of feeding dry corn fodder. I feed about sixteen to eighteen pounds of ensilage at a feed twice a day to each cow.

MR. MCKERROW—Do you have any better results?

MR. GOODRICH—I think they hold out better than they did. I feed them cheaper. Of course I don't feed as much grain as I did. I feed about eight pounds, and there is four pounds in the ensilage.

QUESTION—How long does it take to milk?

MR. GOODRICH — It is done as quick as can be without bothering the cows. I have held the watch on the boys, and it averages about six minutes to the cow.

QUESTION — How do you break a heifer?

MR. GOODRICH — There's very little breaking to be done. I have very little trouble.

MR. POTTER—If one of your cows has injured a teat do you recommend a milking tube?

MR. GOODRICH—No, I think you are likely to do more damage than good.

MR. MCKERROW—If a cow kicks the hired boy, which do you discharge?

MR. GOODRICH—If a cow kicks the hired boy I blame the boy every time.

QUESTION—Do you ever try to harden your cows by letting some one have them who would abuse them?

MR. GOODRICH—Three years ago on a farm I own, a little way from where I live, I had a tenant who was to furnish half the stock. My cows didn't do well, I was sure they were going to die and I took them away, those that were not so hardy. The one I left there I thought could stand it. After a while a boy came down and said that the cow was sick. I went over to see and she was just breathing her last. That is the way my cows stand hardship.

QUESTION—What age do you prefer to have a heifer fresh in milk?

MR. GOODRICH—Two years. I want to set them at work at the business of their life when they are young so they can develop a good capacity for giving milk. I think I can develop them into better cows coming in at two years old

when they have been forced right along and get good growth.

If they have been under fed they won't be any better developed at three years than they ought to be at two.

QUESTION—What breed of cows do you keep?

MR. GOODRICH — I have no full blooded cows of any kind. My cows nearly all descended from Ayrshires, but they are graded up pretty well with Jerseys.

QUESTION—In case the milker sings the wrong tune do you lose in quantity or quality?

MR. GOODRICH—A little perhaps in quantity, but more in quality. I believe that the variation in the butter from day to day is due to some excitement or disturbance to the cow. If she can be kept perfectly quiet, and contented, the flow of milk and the amount of butter fat will be almost the same, other conditions being the same.

QUESTION—Do you think that being out in a little storm injures a herd of cows any?

MR. GOODRICH — I know it does. I know that whenever the flow of milk is checked it cannot be gotten back again without very much trouble. It cannot be gotten back to where it would have been had not the shrinkage occurred.

My youngest son, about 21 years old, has charge of the farm, and as he has a good share of the money that comes from it, he is pretty careful.

Last October one morning they were turned out of the stable, and there came one of those drizzling rains. I suggested to my son that it was rather uncomfortable weather for the cows to be out. He said, "Yes, but I guess it won't rain a great while." Now I really hoped it would rain all day so he would learn something by it, and it did. Every little while the boy would say, "Well, I guess it will clear up pretty soon," but it didn't.

I had twenty cows that were making twenty-eight pounds of butter a day regularly. I knew to a quarter of a pound how much we were going to have. It dropped right down to twenty-five pounds a day and never was gotten fully back. I couldn't help it by feeding for I was feeding to their fullest capacity already. You can believe they don't stay out now in storms.

Now, suppose they had been left out in another cold rain and another shrinkage had occurred. And then the next day suppose they had not been fed all they wanted, still more shrinkage; then after that suppose I got a stranger who was a little rough with them to do the milking, there would have been still more falling off.

You see I couldn't stand but a few such before the cows would not pay for their feed. I went away from home once for a couple of weeks, and left a stranger to milk the cows I had milked, and there was a shrinkage of ten per cent. in the whole herd. The shrinkage in the cows I had been milking was 20 per cent.

MR. EVERETT—Did you ever have a cow ill used by hired help, and while there would be a good flow of milk there would not be any butter fat in it?

MR. GOODRICH—I have found that ill usage reduced the per cent. of butter fat.

MR. WILSON—How do you warm the water?

MR. GOODRICH—With a tank heater.

MR. MCKERROW—Can you take marsh hay and straw and feed them and get as good results as if you feed ensilage and bran, and cotton seed meal and all those things?

MR. GOODRICH—I never tried it.

MR. MCKERROW—Do you think the milk would be just as rich on poor feed as on good feed?

MR. GOODRICH — I don't know. I can tell you some things I do know. I know that feed will make a difference in the composition of milk, and I don't care how many scientific Germans or Americans say to the contary. I know I turned my cows out on grass one spring, but gradually stopped feeding grain. When they were having both grass and grain 15 cows had given four hundred pounds of milk a day, making 18 pounds of butter. In two weeks after I commenced stopping off the grain, on the good grass, mind you, the quantity of milk had not shrunk at all, but the amount of butter had gone down to 15 pounds a day. I fed the grain again, and after a while brought it back to 18 pounds. I simply watered my milk by withholding the grain.

MR. BURKMAN—Is there any benefit in feeding grain when you send your milk to a cheese factory?

MR. GOODRICH—They ought to test the milk and pay for what they get.

MR. MAY—Do you have any trouble with cows leaking milk?

MR. GOODRICH—No, I don't. My cows are nearly all descended from one cow, and that don't run in the breed.

MR. MCKERROW—You evidently think there is a good deal in feed. Do you think there is anything in breed?

MR. GOODRICH—I believe that breed is produced originally by feed and care. I believe that after a great many generations of good feeding, feeding for rich milk, you would have slowly but gradually developed a type of cows so that a character for giving rich milk would become fixed, and they would transmit it to their progeny with reasonable certainty. In this way you would establish a breed. Somebody over here objects to stanchions. My cows are put in stanchions before they are six months old, and they are brought up to them and do well.

QUESTION — Do you milk with dry or wet hands?

MR. GOODRICH — Dry hands every time.

MR. BURKMAN — Do you believe it is well to have them dehorned?

MR. GOODRICH — The horns are of no use that I know of.

MR. MCKERROW — Do you keep up your herd of cows by selecting the heifer calves from the best cows?

MR. GOODRICH — Yes, every time. I feed them new milk for about a week. Then it is partly skimmed, and in about three weeks they are on full skimmed milk. Then I give them a little oats, bran and clover hay. I keep feeding them milk until they are seven or eight months old.

MR. ABBOTT — What do you consider skim milk worth for feeding purposes?

MR. GOODRICH — For feeding pigs I have experimented and a hundred pounds of skim milk made as much growth as a half a bushel of corn. It is worth to me this year twenty cents a hundred. It is worth the most fed in connection with corn to hogs.

QUESTION — How much do you get out of your cows on an average?

MR. GOODRICH — Last year 1890, we milked 20 cows and the average was 320 pounds of butter.

QUESTION — How much in dollars and cents.

MR. GOODRICH — $76.00 for the butter, then I counted the skim milk $10.00 and the calves $3.00, that makes $89.00.

My butter netted me twenty-four cents for the year 1890. I estimate the food for a cow costs about $30.00. I figured about $20.00 for the labor laid out on each cow and the making of the butter. That is $50.00 per cow. That gives me a profit of $39.00 besides the manure.

QUESTION — Give us your figures on feed?

MR. GOODRICH — Forty pounds of ensilage a day for two-hundred and fifty days makes five tons for the year. That is worth $1.00 a ton, that is $5.00; a ton of clover hay worth $5.00 and one acre of pasture to run on — I will call that $5.00, though I think it is too much. Then one ton of bran at fifteen dollars.

MR. EVERETT — Does the quality of the food and water effect the quality of the butter?

MR. GOODRICH — It certainly does.

QUESTION — Isn't well water good enough without warming?

MR. GOODRICH — If I could have water at fifty degrees I would not be at the trouble of warming it, but where it is pumped by a wind-mill into a tank, and has ice on it all winter it won't do. It ought to be warmed up to fifty or sixty. I know they drink more.

QUESTION — Don't you think that some breeds of cows make a firmer butter than others?

MR. GOODRICH — It may be so. I know there are individual cows that make firmer butter than others.

MR. BURTON — How would you pick out a good cow from a strange herd?

MR. GOODRICH — I have failed in doing it so many times I don't think I could tell anybody else.

MR. CONVEY — Does a heifer from a good cow always prove to be a good cow?

MR. GOODRICH — Not always, if she has a long line of ancestors that were good milkers she will stand a pretty good chance.

MR. MCKERROW — What would you cross a Jersey with to make a good cow?

MR. GOODRICH — More Jersey.



# AFTERNOON SESSION—MARCH 18th.

The Institute met at 1:30 P. M. Sup't Morrison in the chair.

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## SWINE HUSBANDRY.

By A. SELLE, Mequon, Wis.

*Pooling Experience*

In presenting to you this paper on swine husbandry, it is not my intention to teach you anything new, neither do I claim that I am an expert, but simply to give you the benefit of my experience, in this branch, and I hope that it may be of some value to those who like myself, look for improvement by comparing their own experience with that of other farmers.

No branch of stock raising is subject to such fluctuations of prices from one year to another as hogs. The price often doubles itself inside of two years, and again declines 50 per cent. of itself in the same period; one reason for this is, that hogs can be increased and decreased quicker than any other stock.

When hog raising on account of fair prices and cheap corn, this year increases, then the next year's market will be flooded with hogs, and prices will certainly go down considerably. Now, the corn crop may be a failure or fall short of the expectation and its price advancing in consequence then most farmers will rush to get rid of their porkers, sell their corn in its natural state, or use it for other purposes more profitable than feeding it to the hogs, the consequence of this may be, that the prices of hogs again begin to rise next year.

The same price fluctuation we also observe with the little piggies. Sometimes they are almost unsalable, while at other times they readily sell at $3 a head and more.

*Breeding Stock.*

In the raising of hogs, the most important part is the proper selection of *breeding hogs.* The old long legged, long necked and shy animal that is known under the name, country hog, razor back, Missouri hazel splitter, and when scared at almost anything, laid its long ears well back, and went off in a grunting gallop, with a speed that puts a common race horse in the shade, is now a thing of the past, at least in our region.

No other branch of stock has, in a comparatively short time, experienced such general changes as the hog, and the success certainly depends on the proper selection of breeders, and care has to be exercised to breed animals that combine a quick development of body with capability of fattening.

The region and locality also has to be taken into consideration in selecting breeding animals, also whether pastur-

age or pen feeding will be their principal reliance.

It has further to be considered, whether the market calls for meat hogs, or for lard and bacon.

### *Clean, Healthful Pens.*

From the description of suitable hog-pens, I may as well abstain, as farmers will not easily make any alteration in such existing institutions; and if they in general suit the purpose, often the simplest and cheapest are the best.

But the hog-pen ought to be in such a condition, that no one need be afraid to go into it himself. In dirty mud holes in which we can only get around with a lantern in broad day light, and where we get the liquid manure into the boot-tops, no hog can exist decently, much less can it thrive or grow fat.

During summer and fall, or whenever the weather is dry and pleasant, any building is good enough for hogs, and God's green earth, for a floor, and the clouds and blue sky for a roof, is just as good a pen as the best. Although the hog likes to wallow in the mud during hot weather, it will look for a dry place to sleep at night.

In selecting the brood sow it has to be well observed, to select one with well developed characteristics of the respective race or stock, in order that these will be transmitted to her progeny, and to select one that is born in spring and from a mother that has distinguished herself in raising numerous pigs in each litter. Only the soundest and strongest animals of a litter should be selected for breeding. Besides the general characteristics of a sow the following points are very desirable: A light head, a long deep body and at least twelve developed teats, the more the better, in order to be able to nurse a large number of pigs.

Wild and unruly sows, and such as have the bad habit of killing and eating their young, should be entirely discarded for breeding.

### *Breeding Sires.*

Of more importance than the sow, is the selection of a breeding boar, as he may be mated with hundreds of sows during his life-time. A young boar should not be stinted in food, and should be kept growing till he is a year old, but at the same time, must not be allowed to get too fat. Now some persons who have never kept but common pigs, are very apt to think, that their full-blooded boar is getting too fat; as the roundness of the body with the small growth of bone and offal parts, leads him to believe that the pig is not growing as fast as he should.

When a boar is full-grown, he will not require rich food, but enough to fill his stomach and keep him in good strength. A boar should not commence to serve, until he is at least ten months old; one service is sufficient; allowing more is only wasting the strength. When heavily worked, I feed accordingly; a daily ration of oats is very good. In winter I feed corn ensilage, clover hay cut fine, scalded or steamed and mixed with some middlings and skim-milk. Some persons think when they buy a thoroughbred pig he could live on a smaller quantity of food than a mongrel, and the consequence is that the animal goes backward and the purchaser begins to growl against pedigreed stock.

Daily exercise with enough of plain food will keep the boar in good health and vigor.

*Care of Sow and Pigs.*

When well provided with food and stabling it is best to have the sow breed pigs twice a year, and to let her take the boar in November and April, so that she will bring the pigs in March and September. In spring the pigs may be allowed to go out into the pastures right away (after weaning), and are therefore the less expensive to raise.

If September pigs are raised, they will be well developed before severe frosts come, and any one who has a dairy and makes butter can make good use of the skim milk, and next spring will be found a fine market for 6 or 7 months pigs.

Without milk, proper food and a dry pen, the young pigs easily get stunted, and anybody who does not have these things, had better leave hog breeding alone, at least in the fall.

The sow should not be let to the boar at the beginning of the heat, but when the sexual desire has reached its height, about 30 or 36 hours from the beginning, as its duration is generally three days.

The advice of many breeders, to have a sow only once a year with young, cannot always be followed, and it is best in my opinion, to be guided by nature. As a rule the sow will get into heat again about six or eight weeks after she has given birth to pigs, and when nature is not satisfied, then again in three weeks.

Many sows are very restless at this period, and it is not unusual that stable doors, fences, etc., have to be fixed every few days. It is best at such times to confine them in a pen by themselves until the paroxysm of heat has passed.

The day of coition of the sow should be carefully noted, to determine the time when pigs will be born. It is not advisable to feed the sow too heavily during pregnancy, for she will either grow too fat, or develop the young ones too much, and both cases will tend to render birth difficult. Exercise in the open air is very beneficial to pregnant sows.

*Farrowing Time.*

A few days previous to farrowing, the sow should be separated from the rest, and put in a separate pen. Long straw should not be used for bedding, as the young ones will easily hide in it, and are liable to get smothered; a few baskets full of finely cut straw is the best for bedding. The sow should not be fed with anything the first day after she has given birth to young ones, and for the following three or four days only sloppy or liquid feed should be given. Care has to be exercised, not to overfeed the sow, in the first three or four weeks and the quantity of food should be increased gradually. Mouldy feed, damaged grain and sour swill should never be given to breeding sows or piggies. I have observed that the sow likes salt very much at this time, and I always keep on hand a mixture of good wood ashes, salt and some chalk, and give a few spoonfuls of it daily.

To prevent the accidental or careless smothering of the young ones by the sow, round poles should be fastened around the walls of the pen, about eight inches from the floor, and one foot from the wall, behind which the young can escape. But if the sow is a natural good breeder, all these precautions may not be necessary.

At the side of the pen of the sow, I have erected another small pen, and both connected by small openings, through which the young pigs can slip; in this I put shallow vessels, as old pie

plates, etc., with sweet milk, also soaked wheat or corn, to induce them to learn eating.

When the trough of the sow is long and shallow, so that the little ones can easily reach in, and the feed is prepared in a proper manner, lukewarm, and mixed with sweet skim milk, the young pigs at the age of three or four weeks will commence to eat, without having this little side pen.

Sunshine is very beneficial to the little pigs, and doors should open to the south. It is a good plan to have a mixture of clay, salt, ashes and charcoal, in a trough, so that they, the sow and piggies, can get it whenever they want it.

The most prevailing disease of little pigs is diarrhœa or scours, caused mostly by improper food of their mother, but another principal cause is a wet and dirty stable, and the foul effluvia rising from the liquid manure that has gathered below the floor.

To prevent this, the stable floor should be made solid, say cement, and have an inclination or fall to one side, to drain the liquid manure. Also admit plenty of air, and scrub the floor with fresh lime water, once a week. Sometimes it is sufficient to change the food of the mother, and so give a spoonful of powdered caroway, anise and fenugreek twice a day.

If the stable is as it ought to be and a little care is exercised in proper feeding, then all this is needless.

*Fattening.*

The hog fattens very quickly compared with other animals, but it requires a corresponding amount of food in quantity as well as quality. A cheap and quick fattening depends greatly upon the health and age of hogs, as well as upon the season, and the condition of the food. For the fattening of meat hogs, that will produce a nice, tender meat, streaked with fat, I select from early developing stock, at the age of four to seven months.

On account of the rapid digestion, hogs cannot assimilate all the nourishment from the dry food, and this should be prepared in such a manner as to make the loss as little as possible, either cooked or bruised. To feed the hogs until all parts have changed to fat I do not consider profitable, for the fatter they grow, the slower they increase in weight. To begin the fattening with rich food from the start, is a wasting. Corn or peas should be left for the latter part of that process. Some rules have to be observed in fattening, to insure success. The best rule is to have the provision food succeeded by one more nourishing, and when the appetite begins to diminish, to feed less in quantity, but more in quality.

The time for feeding should be kept as regular as possible, else the hogs grow restless. The pen also ought to be kept somewhat dark, and provided with dry bedding. As much as the breeding animals need exercise for their prosperity, the hogs for fattening, need rest and quietness. An old proverb correctly states it thus: "Rest and quietness is half of the fattening."

To encourage appetite and digestion, I give daily some salt-ashes and antimony.

Always try to raise the best and what the market calls for. Raise hogs when they are cheap so you will have some for sale when they are dear.

With a little care and when well provided with proper food, stabling and pasture, in order to give them exercise, hog-raising is no trick at all, and it is almost as easy to raise a litter of pigs as it is to raise a patch of Canada thistles.

# HOG PENS.

BY GEO. WYLIE, Leeds, Wis

*Comfortable Shelter.*

In order to realize the best results in raising swine, something in the way of comfortable shelter is an absolute necessity. Occasionally we find a farmer with the idea that an expensive hog house is necessary to the profitable handling of swine. Where we find one such farmer however, we are liable to find a dozen strongly imbued with the idea that a straw stack or a wire fence conserves every purpose or perhaps, present circumstances forbidding the outlay considered necessary in that direction, they allow their swine just for the present or until something turns up, to shift for themselves on the old root hog or die principle. After an expreience with almost every method of sheltering and feeding swine, we have come to the conclusion, that an expensive hog house at least is not one of the requisites necessary to the profitable production of pork. Your blue-blooded aristocrat of the human family is satisfied with nothing short of a modernized Queen Ann with a cut stone foundation. But your blue-blooded aristocrat of the porcine species with a gilt-edged pedigree tracing nowadays through ponderous volumes of hog lore is satisfied with any shelter that keeps him warm and dry.

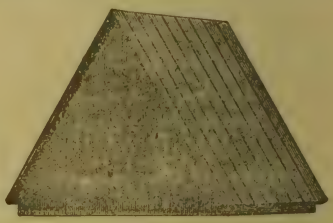
*A Well Filled Trough,*

in a "pigs eye," is more appreciated than the grandest design in architecture ever invented. In practice the objection we have found to the large expensive hog house where any considerable number of swine are kept under one roof is a difficulty in keeping it clean. In such a pen it is hard to arrange ventilation to keep the air pure and healthy. At farrowing time with ten or twelve or more sows, all in adjoining compartments, if one sow steps or lies on a pig, all the others spring to their feet and pandemonium ensues. If one sow that necessarily must be fed is given anything, others that should be kept quiet or fed very little, get up and expect the same treatment. The tendency of the whole establishment is toward irritating the tempers of the brood sows, which should be avoided at farrowing time. The larger the hog house the colder it becomes in winter and in summer it is difficult to arrange for sufficient access to pasture; Another strong objection is that the expensive hog house must be a permanent fixture, and where many hogs are kept, any one who has had experience knows that the ground surrounding it after a year or two becomes filthy and impregnated with the droppings of the animals. They are also liable to make unhealthy wallows in close proximity with the pen and these wallows are almost impossible to keep filled up when the ground is used permanently for swine. All this tends toward an unhealthy condition of the stock, and health above everything else in raising swine is of the first importance. In fact the only point I have

been able to discover in favor of the expensive hog house is that it is a little more pleasant for the feeder in a cold or stormy day.

*Inexpensive Pens.*

The pens that have given us the best satisfaction are small inexpensive insignificant affairs, costing from $5 to $10 each. The strongest point in their favor is health, fewer hogs being kept under one roof; this one point of health of itself should over-balance any objections that might be urged against them. When the ground around the pen becomes foul by continued occupation, these pens are easily moved to a fresh location, and the ground previously occupied by them plowed up and a crop or two raised from it, thereby purifying the soil. After two or three years it can be again seeded to grass and the pens returned to their original location. A rotation of hog-pens once in two or three years goes farther in the direction of maintaining fertility than anything I have ever tried. With this kind of pen, or as many pens of this kind as may be necessary for the number of hogs kept, the original outlay for pens is reduced to a mere nothing in comparison with the large hog house. They will pay for themselves every year they are used. With this system, less than half the labor will keep the pens clean; they are warmer, the air is purer, the young pigs are healthier, and large numbers at any season are prevented from piling up together. At farrowing time each brood sow is isolated from the others, thereby being removed from anything liable to make them irritable or restless. Bear in mind I have no wish to prevent any farmer with plenty of money from building as expensive a hog house as he desires. I am talking to farmers who may think as I used to, that an expensive hog house is necessary to raise fine pigs. And while recommending cheapness and economy in the way of hog-pens I do not wish to be understood as arguing that "anything is good enough for a hog." The essentials to be secured are health, comfort, warmth and cleanliness and any outlay of money that goes beyond this must be regarded in about the same light as a prominent breeder regarded his expeneive 30x60 hog house. Said he: Its not much account for swine, but its awful nice to show to visitors:



Bill of lumber for this pen is as follows: 256 ft. inch boards 1x12—16ft; 6–2x4—16 ft. 12 bats 16 ft. long 4 inch wide.

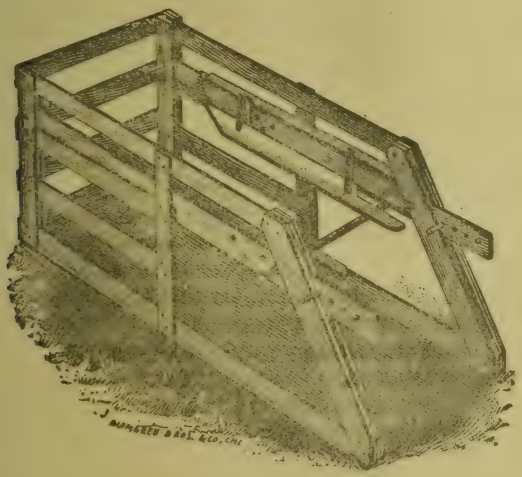


Bill of lumber for this pen 502 ft. 1x12—16; 8 2x4, 16; 20 bats 16 ft. long 4 inch wide.

*A Breeding Box.*

Nine-tenths of all farmers throughout the country make use of young boars and sows for breeding purposes. A boar six to ten months is used one season and then discarded and another young one put in his place; this is a mistake,

especially when the boar proves a good breeder. When a very prepotent sire is found it will pay to buy brood sows to be bred to him. The objection usually urged against keeping a boar is that he gets too large and heavy for service. With the breeding box illustrated herewith any sized boar can be bred to any sow.



The difference between this breeding box and any box of the kind that I have ever seen is that this can be adjusted almost instantly to fit any sized sow after she is in the box, both as to width, height and length. The front end is better if boarded up tight. A four or six inch board nailed across the top four or five inches back from the front end would effectually prevent sows from getting out over the end. The "chin rest" for the boar so often seen on other boxes is not necessary with this as the adjustable steps for the boar's feet effectually prevent his feet from slipping down between the sow's body and the step, so that his weight is at all times on the steps and not on the sow. The adjustable step or shelf is six inches in width when closed, but when clear open is about double that in width. The steps on both sides can be made adjustable if desired, but I have found that an adjustable step on one side makes a fit for almost any sow from 200 to 500 lbs. or heavier.

We have used this box for nearly all our sows, old and young, this season, and we find that a young boar will serve a large sow much more easily in the box than out of it. For a young boar and an old sow a small platform for the boar is placed behind the sow. The sides at the rear end are made slanting because the height of the steps are more easily adjusted in that manner and there are no sharp corners in the way for the boar to fall against in getting off.

The iron rod to hold the sow in the box is a piece of gas pipe one and a quarter inches thick. The boards through which this rod passes must be good sound fencing six inches wide. On the inside of these boards and up tight against the shelves or foot rests, a piece of 2x4, about two feet in length should

be nailed to strengthen the shelves or foot rests, as a heavy boar will sometimes place nearly all his weight on them and they must be stout. The two straps of iron that make the steps adjustable are eight inches each in length between the screw holes, one quarter inch thick and one inch wide. Two small bolts through the shelf with the nuts up (or two one and a quarter inch wood screws will do) and two wood screws at the other end hold them. The pin and pin holes at the upper end allow the step to be adjusted to the width of the sow in the box. At the front end of the box are two pins, one on each side with different holes for the raising and lowering of the front ends of the boards supporting foot-rests; the method of raising and lowering the rear ends will be readily understood. The floor is put on crosswise; two laths on the bottom lengthwise make it slide easily in moving.

The adjustable step, the method of fastening in the steps or adjusting them as to height, the slanting ends of the box, and the application of the gas-pipe rod in connection with the same are what is new, and so far as I am aware have never been used before. A 600 or 700 lb. boar can serve any sow old enough to breed in this box. The diminsions are 2 ft. 4 in. wide; 2 ft. 6 in. high; 4 ft. long on top and 6 ft. long on bottom—all outside measurements

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*DISCUSSION.*

MR. MCKERROW—How would it do to have a movable yard that you could put in front of either one of these pens if you wanted to pen up a few brood hogs?

MR. WYLIE—That is all right for a short time. But I don't believe in penning up much. Hogs need plenty of range to keep healthy.

MR. ARNOLD—Tell us about training a hog.

MR. WYLIE—It depends on the man who handles it. You can train a hog to do almost anything if you use him kindly and don't try to force him. I don't approve of ringing hogs on general principles. If hogs are fed on the right kind of rations, they won't root much. If you are only going to keep them a few weeks and turn them to market it might pay to ring them. I raise hogs largely to sell as breeders, but I would not pen them up too closely if I were feeding them for pork.

MR. MONRAD — How much do you value 100 pounds of skim milk for feeding hogs?

MR. WYLIE — Under ordinary conditions skim milk is worth about 20 cts. a hundred pounds, that is, when fed alone; but it is worth more than that fed in connection with something else. It is worth more fed with corn than with most any other ration, skim milk and soaked corn for young pigs can hardly be improved on if cost of production is considered.

QUESTION — Are not whole oats and skim milk good for young pigs?

MR. WYLIE—The oats would be better ground for young pigs and even then you are not getting the right kind of a ration. You know skim milk is one of the best bone and muscle feeds there is, and so is oats. After a pig is past a certain age, if you will give him all the skim milk he can drink, and give him plenty of exercise, you can safely give him all the corn he will eat, and have the best ration of any. That is working on the principle that the profit is in the

first 200 or 250 pounds. It needs judgment to feed right. We have had some mighty good hired men at our place, but they never make a success as pig feeders because they lack that interest in the business that ownership gives.

MR. FLEMING—At what time would you advise the farmer to have his pigs farrow?

MR. WYLIE—Not much before the 15th of April, generally. There are very few men in this state that can raise two litters of pigs with profit. The first litter must be too early in the season and the second must be too late. There is nothing so detrimental to a young pig as cold weather. If any man can do it in Wisconsin, it is the dairyman who has lots of skim milk.

MR. HAYWARD—How is rye for your pigs?

MR. WYLIE—First rate.

MR. HAYWARD—How would you care for March pigs?

MR. WYLIE—I would rather take care of ten brood sows littering the first day of May than two the first day of March. The trouble is they don't get to the ground. The young pig needs fresh earth and grass and warm sunshine. You will have too keep March pigs shut up. You can only give them fresh dirt every day and see that they have exercise.

QUESTION—Do you feed vegetables to sows in winter?

MR. WYLIE—Yes, I feed a certain amount of mangelwurzels.

QUESTION—How many pounds of pork can you make from a bushel of corn?

MR. WYLIE—That is a great big question. Twelve is possible, fourteen may be made. The average Wisconsin farmer makes between six and eight.

QUESTION—How old do you have your pigs before you wean them?

MR. WYLIE—I never wean them. The whole success of swine raising is right there in the matter of weaning pigs. A farmer sees a brood sow getting kind of thin when the pigs are about four weeks old, and he says, "Those pigs have got to be weaned." He goes to work to construct a little 8 by 10 pen and catches the pigs and puts them in there, and the sow turned out, and in one or two weeks they are pretty effectually weaned; the profit has been all weaned out of them. A pig never should realize that there is such a thing as being weaned. It never should know when it ceases to depend on the dam and begins to depend on you. All the feed that you can get your pigs to eat after two or three weeks, when they should begin to eat, is just so much saved on the dam. They will wean themselves if you feed them right. Scarcely any of them will be suckling at ten weeks old.

QUESTION—Did you ever weigh your pigs when they were two or three weeks old and then in one week afterward, to see how much flesh they had taken on?

MR. WYLIE—My only experience with weighing was with a litter of eight. We weighed that litter the morning of the day they were eight weeks old. They weighed exactly 400 pounds, an average of 50 pounds each; these pigs, however, were better pigs and were better cared for than the average.

MR. MCKERROW—At what particular age or size can you make pork the cheapest on them?

MR. WYLIE—A well bred pig handled rightly, will give you as large returns for the food he has consumed along between fifty and one hundred pounds as he ever will.

MR. MCKERROW—Then at what size will it be most profitable to dispose of him?

MR. WYLIE—He is making gain right along and doing well, up to 200 or 250 pounds. On general principles, when a hog gets to be about 250 pounds, you had better let him go, and put the feed over into a younger pig. Of course, the market and other things have to be considered. He ought to weigh that when he is seven or eight months old. A pound a day is very good gain.

QUESTION—How would you care for brood sows prior to farrowing.

MR. WYLIE — I would have mature brood sows in the fall in rather thin condition. I would begin feeding gradually, start them to gaining and keep them gaining through the entire winter clear up to farrowing time in the spring, when I would have them in good strong flesh and heart. Now if that flesh that you put on during the winter is put on with corn, the pigs won't amount to much, so we don't put it on with corn, we put it on with a combination of oats, shorts and corn in about equal parts. We feed the oats the first thing in the morning, spreading them out thin on a dry floor so they cannot bolt their food. They can only pick up a few grains at a time and masticate their food. At noon we feed them the shorts made into slop, and we feed it warm. I have found out by experience that a pig's stomach is a very expensive place to warm ice water. You can better afford to warm that water with cord wood. Two bucketfuls of hot water will warm nearly half a barrel of slop and you might warm it on the kitchen stove, but that will depend a good deal on the disposition of your wife. We used to warm the water for the pigs on the kitchen stove, but we don't any more. The atmosphere in our kitchen used to get hotter than the water, and we had to quit. We warm the water with a tank heater in a water tank. We start the fire in the morning and by noon it is up to 70°.

QUESTION—If pigs have black teeth, does it hurt their health?

MR. WYLIE—No, that is on a par with hollow horns in cattle.

MR. BEMIS—I butchered pigs this fall at seventeen months old, that weighed 350 pounds.

MR. HYHTT—With a well balanced ration in the winter do you feed ashes?

MR. WYLIE—My hogs always have free access to salt and charcoal and wood ashes. Our sows are fed roots about this way, one meal a week during December, two meals in January, three in February and four in March, and clear up to farrowing time they get four meals. Clover hay might do as well to a certain extent, but I would rather have the roots.

QUESTION — Does it pay to winter hogs for profit?

MR. WYLIE — As a general thing, no, A Wisconsin farmer cannot afford to winter anything but his breeding hogs.

MR. OLSEN — What is the cause of a brood sow eating her offspring?

MR. WYLIE — A diseased condition of the system. If she is fed plenty of roots previous to farrowing time and gets plenty of exercise, she won't do it. Then again at farrowing time they should be fed something laxative, and very light at first.

QUESTION — Do you breed from mature dams?

MR. WYLIE — Yes, mainly.

QUESTION — How long do you keep them?

MR. WYLIE — Usually not longer than

four or five years. When you have something as good or better to take her place let the old sow go.

QUESTION — Is it possible to keep the dam from losing flesh rapidly while suckling her litter?

MR. WYLIE — I don't like to say that it can't be done, as most farmers don't feed their brood sows enough; and take it for granted that she will lose flesh anyway. With a mature sow and not too large a litter it can be done. Young sows and old ones, too, with good sized litters will be apt to lose some flesh even if fed all they will eat of the best kinds of food, good brood sows always get a little thin while suckling. In fact a fleshy sow is never a good suckler. The feeder however should do his level best trying to make them hold their own.

QUESTION — Do you feed dry or soaked?

MR. WYLIE — We soak corn for spring pigs until the new corn is ready to feed. What little corn we feed brood sows while suckling is usually fed in the ear dry. Shorts we always soak between feeds except in the winter.

QUESTION — What is the best pasture for hogs?

MR. WYLIE — I think white clover a little the best, but red clover is good enough and easier to get.

QUESTION — When should hogs be turned on clover, at what stage of growth?

MR. WYLIE — When about 4 inches high.

QUESTION — Should grain be fed to hogs while on clover pasture?

MR. WYLIE — Spring pigs and brood sows should be fed about all they can eat in addition to the clover. But if you have some shoats or old hogs that have been wintered a run of a month or six weeks on grass alone will put their system in the best possible shape for utilizing the corn to the best advantage when you begin to feed it.

QAESTION — What is a good daily gain for hogs on pasture?

MR. WYLIE — On grass alone a hog will make little or no gain whatever; grass as an exclusive food for hogs has been greatly over estimated; as far as gain made is concerned about all there is to grass for swine is that it keeps the system in shape to utilize the grain fed to the best advantage. If you feed grain to swine on grass the amount of gain will depend entirely on the amount of grain fed, the more grain you feed the less grass they will eat, this is why I favor a run of a month or six weeks on grass alone for hogs that have been wintered, and then putting them on a full ration of corn to finish them up quickly.

QUESTION — In what manner should corn be fed to hogs?

MR. WYLIE — I usually feed mature hogs corn in the ear; for pigs shell and soak. I don't think it pays to grind corn if it can be soaked?

QUESTION — Does it pay to grind oats for hogs?

MR. WYLIE — In feeding oats to young pigs if I had plenty of shorts to make slop I would soak the oats. In the absence of shorts I would grind the oats and make slop with them for mature hogs such as brood sows during gestation I would feed the oats dry without grinding.

QUESTION — Is it advisable to cook food for swine?

MR. WYLIE — An occasional meal of cooked food is good by way of supplying a variety. But the conditions under

which it will pay to feed cooked food exclusively are very rare. A large crop of pumpkins or potatoes that there is no market for would justify the feeding of considerable of them cooked and mixed with meal.

QUESTION—Which is considered the cheaper wheat or barley at the same price per pound?

MR. WYLIE—I would take the wheat and grind it as it makes the best kind of slop.

QUESTION—Can you make hog raising a success without dairying?

MR. WYLIE—Yes, but dairying makes it easier, that is if you are making butter.

QUESTION—Can you tell us anything about the feeding value of whey?

MR. WYLIE—As whey is usually fed it has no value in fact. I think it an injury to feed sour, acid whey to young pigs, and even fed sweet I don't think it much value, unless a certain amount of shorts or meal is mixed with it; fed in this way it has a feeding value, but not half as much as skim milk.

QUESTION—Have you had any experience in raising fall pigs for fattening the next summer.

MR. WYLIE—Yes, pigs farrowed after the middle of September as a rule seldom pay for raising in this latitude, young pigs are very difficult to make thrive in cold weather, and we should aim to raise them under as favorable conditions as possible when weather is warm.

QUESTION—What is your treatment in case of scouring in young pigs.

MR. WYLIE—There are several remedies- first hold up on the feed of the dam or change it to something else. If this does not stop it take a lump of alum the size of a walnut, dissolve it in a pint of water, give each pig a teaspoonful three times a day. Another good remedy is to parch wheat flour until brown, and mix with skim milk and feed in the same way, or if the pigs are old enough to eat feed in a trough. This last is an excellent remedy for scours in calves or young colts.

QUESTION—What is the comparative value of a bushel of corn fed in June or July when the hogs have the run of a good clover pasture or fed in January or Februarry with the thermometer 20° below zero?

MR. WYLIE — Over 100 per cent. in favor of summer feeding.

QUESTION — Under what conditions may corn be fed exclusively to hogs?

MR. WYLIE—When they are being finished up for market.

QUESTION—How many breeding sows should run together during gestation?

MR. WYLIE—With plenty of room we allow 15 or 20 during the first half of gestation, but later we divide them up, putting those of the same size and disposition together as near as possible. The last month four or five old sows is as many as we allow together.

QUESTION — Is it essential that pigs should have any corn until 60 days before marketing?

MR. WYLIE—Under certain conditions it may not be necessary, but you should remember that corn is cheap feed usually, and I always feed some corn from the time a pig is old enough to eat it.

QUESTION—How many pounds of pork can you make from a bushel of ensilage?

MR. WYLIE—That will depend entirely on the amount of corn in the ensilage. If there is no grain in the ensilage I don't think your hog will get very fat on it, and if there is grain in the ensilage, the hog will eat the grain and leave the stalks and leaves.

QUESTION — Does barley make good food?

MR. WYLIE—I don't like barley to feed by itself, pigs get tired of it very quick unless you are very careful in feeding it, it is best mixed with something else, such as bran or shorts. If I had only bran to feed it with I would grind the barley and mix the bran with it, if I had shorts, I would make slop of the shorts and soak the barley without grinding.

QUESTION — In the absence of skim milk what is the best food for young pigs?

MR. WYLIE—Good shorts, middlings or ground rye made into slop and fed in connection with soaked corn.

QUESTION—How about rye for brood sows during gestation?

MR. WYLIE—I don't think it a safe feed for brood sows at that time.

QUESTION—In increasing size which is preferable, a coarse boar or sow?

MR. WYLIE—I think there is not much difference, the progeny will as a rule be a compromise between the two as regards size.

QUESTION—How do you kill lice on swine?

MR. WYLIE—Take kerosene and lard, equal parts, melt the lard and pour the kerosene into it, make a swab by tying rags on a stick and apply at once. Two applications, allowing a week to intervene will unusually be sufficient. Crude petroleum oil will answer the same purpose of the lard and kerosene, but is not always so easily obtained.

QUESTION—What is the size of the small pens, that you gave the bills of lumber for?

MR. WYLIE—The A shaped is 8 ft. by 8 ft. on the ground and the roof is the same. The other is 16 ft. long and 8 ft. wide, 7 feet high in front and 3½ in the back.

## SHEEP HUSBANDRY.

BY MR. GEO. MCKERROW. Sussex, Wis.

*Mr. President, Ladies and Gentlemen:* Knowing that I cannot do this subject justice in the short time allowed me, I will strive to bring out what I consider a few of the important points in the business.

First, I will speak of the advantages of sheep husbandry. Sheep, for the food consumed, the money invested, and the care expended upon them, will give as good results as any line of live stock.

There is no animal that can be kept upon the farm that will assist in cleaning it up, freeing it from weeds and brush as well as the sheep. Yet don't understand me as advising you to keep sheep on brush and weeds, for if you do, you will not have success.

There is no animal on the farm that will do more in keeping up the fertility of the farm.

I am not here to raise a question of breeds. We have many good breeds of sheep. The American Merino cannot be beaten in the world for wool production, and yet its breeders are changing their tactics. They must breed larger, stronger sheep with more mutton qualities, sheep with more constitution, so that their progeny will be

stronger and need less care, and the dams will be better fitted for providing for their progeny. Located as we are in Wisconsin, near some of the largest cities of the west, and upon high priced lands, to make this business succe-sful, we must turn our attention more to the mutton side of this question. There is no class of meat produced that is cleaner or healthier than mutton; the people of our cities are growing in their appreciation of it.

*Gilt-Edge Mutton.*

High quality lamb mutton, brings to-day from three to four cents a pound more than poorly fed old mutton put upon our markets. I believe mutton can be produced as cheaply as beef. This has been proved by experiments at our experiment station and at the Ontario station.

We have many good mutton breeds of sheep introduced into this country. We have what is termed the "Middle Wools" as found in the Southdowns, Shropshires, Oxforddowns, Hampshires and Horned Dorsets. We have the long wools, as found in the Cotswolds, Leicestershires and Lincolns. These breeds all have their good qualities. If you wish to start in sheep husbandry, study these breeds make up your mind which suits your soil, climate, and conditions, and follow that breed as long as you can get any satisfaction out of it. If you are going into mutton production you must make up your mind to be good feeders. You cannot handle these mutton sheep that have been developed by high breeding and high feeding and think that you can feed them as lightly as a grade Merino that you are only seeking to get wool from. If your go in with you mind made up to give them a good chance they will give you good returns.

Now as to the money to be made in this business.

*Good Prices.*

A friend of mine last year realized over $7 a piece out of his common sheep and gave them only ordinary care. His lambs brought him, last November, $5.10 per head and his wool something over $2.00 per head. About six weeks ago I sent a few fat wethers, two years old to Milwaukee, and they were sold, one in a place, to leading butchers of that city to hang up before their meat markets. One of the best, dressed one hundred and seventy-five pounds; he was sold at nine cents a pound, and his pelt was sold for two dollars giving a total on that one sheep of $17.75. That sheep cost me to keep him the two years and ten months that I had kept him, about $13. Yet I made a mistake in keeping them as long as I did. If I had sold them at eleven months old, when they averaged 140 pounds each, I would have gotten six cents a pound for them and they would have brought me $8.40 each, and would at that time only have cost me about $5.00, giving me a net profit of $3.20. These that I kept two years and eleven months brought on the average $13.20, and so I only made about 20 cts. on each sheep on the average.

*Profit in Early Maturiey.*

We get the most profit if we sell our sheep before they are a year old. If I were starting to breed with the object of mutton production in view, I would not go to some breeder and pay him $30 and $40 per head for pure bred registered ewes. I would start with the best common sheep I could buy in the country at a reasonable price and with a good pure bred sire would raise up a flock in a few years which would be just as good for practical purposes as pure breds, but

you must start in with a clear idea of the line you intend to follow.

In caring for our sheep we must use judgment coupled with liberal feeding. In the summer they must have plenty of pasture which will be best not to be over one and a half or two inches high and the flock should be changed often from one pasture to another. They should have access to water and salt at all times. Late in the summer or early in the fall is the critical time in the sheep business, because it is the weaning time, when our lambs must receive no set-back. To wean the lambs put them in a good pasture with one or two old sheep as leaders. Put in some grain troughs, but don't feed too much grain; a quarter of a pound of oats is plenty to commence with. When the cold rains of the fall come be careful to house your sheep. Don't allow them to depend on the frozen grasses of the fall; if you do the wool will stop its growth, and the next season you will find a week place in that wool, and your fleeces will run from two to four pounds less than if you keep them in good shape and they will not be as well and strong as if properly fed. In the winter be sure that you have a variety of feed of the proper kinds. Clover hay is excellent.

Well cured corn fodder or oat straw are good. Ensilage in many places is taking the place of roots, and giving good satisfaction when properly fed.

In feeding don't spread out your hay or fodder; too much is wasted that way. Have a rack to feed in, and don't give them any more than they will eat up pretty clean. Feed regularly, the same amount at the same time every day Give your flock plenty of exercise, especially the breeding ewes. Without ex rcise the lamb crop will not be satisfactory.

In housing our sheep we don't want warm quarters for them. In building sheep houses or barns there are two points to keep in view. One is to have them well ventilated, and another is to have them free from draughts, so the wind don't blow in directly on the flock. It is all right to have it open on one side. Have it so plenty of sunshine can get into it, facing the south if possible. I believe ticks are costing sheep breeders in Wisconsin thousands of dollars every year. It don't pay to keep ticks and we don't need to. If we will dip our lambs from seven to ten days after the sheep are shorn in some of the patent dips or strong tobacco water, we will have no more trouble with ticks for a year.

I believe the great majority of our sheep have grub in the head during the winter and then blow it out in the spring, and if they don't have the strength to do that they will be very likely to die.

A neighbor of mine sent for a Scotch man to look at his sheep, and the Scotch man said, "What is the matter with them." "Oh, they have grub in the head." He said, "You think they have grub in the head, and I think the matter with the flock is they lack grub in the stomach."

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### *DISCUSSION.*

MR. RICE—Can you rid your lambs of ticks by once dipping?

MR. MCKERROW—Yes, so that I have no trouble unless I buy in lambs that have ticks on them. I have been using a chemical dip. We think that it gives a better lustre to the wool than tobacco water which will kill the ticks and the nits.

HR. HYATT — After you wean your

lambs is it necessary to look after the breeding ewes?

MR. MCKERROW—Yes, they should be gotten up every forty-eight hours and milked until dried off.

QUESTION — Will sheep do well pasturing with other stock?

MR. MCKERROW — Yes, they will do better than the other stock.

MR. HEMMINVAY — Would you recommend raising lambs early in the spring to keep over or sell?

MR. MCKERROW — I would not advise anybody to breed early lambs unless they had good buildings and a good supply of succulent food, (roots and ensilage), plenty of clover hay, bran and oil-meal, everything to make them grow, and put them on the March or April market. Then there is lots of money in it. For lambs to put upon the market during the summer I would not advise the average flock-master to have lambs dropped before the middle of April. The early lamb makes the best sheep in most cases, but costs a good deal to raise him.

MR. TOWN — Have you ever used common rock salt for your sheep?

MR. MCKERROW — I never have. I believe it is a good thing. We have a trough in the edge of the field where they can always get salt. I feed sulphur during the summer along with the salt. I believe it is good to keep parasites out of the lambs' stomachs and lungs.

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# PROFIT IN SHEEP HUSBANDRY.

BY W. L. AMES, Oregon, Wis

*The Advantages.*

Fortunate conclusive wording! Had it been profit in beef making. Profit in pork making at the present time. Ah me! I should have had to admit as in schoolboy days. "I can't spell it," and thus have been delinquent in my duties here or else have had to remain at home, and to remain away from a farmers' gathering of any kind within ten miles of my home would surely be a cross to me.

But, I am called on for a practical discussion of our favorite line, in which the idea of *profit* is to figure, or placing it in a little different wording, "Why have we in the past, and why do we continue, so persistently, in the sheep lines." In the hastily prepared thoughts that follow I will endeavor to answer. It is needless to mention to this audience that we are agriculturalists the same as they. Striving first, to obtain an honest living as agreeably to ourselves as possible, and secondly to make *some* provision though but scant, for a wet day ahead.

In pursuance of this idea we have had considerable experience with dairying, beef and pork making, grain raising and sheep husbandry, and from the pioneer days of this country, the *latter* line has seemed to have become wedded to us as a factor in the most of our farm undertakings, that have approached *to* or

merited in *any* degree, the tittle of *success*.

It seems to me that we have tested them in nearly all practical ways, and in this far exceeding any kindred line, first in clearing *new* land of sprouts and under-brush, and later in keeping the same and other lands clear of foul weeds, in exterminating Canada thistles, in renovating exhausted lands, in shirking for themselves to advantage, on forage, that nothing else in the animals line would live on, and in feeding them with a generous hand, and in every case proving our *most* economic factor in successful farming. In fact, I do not hesitate to say that they are the *one* line, in which profit may be considered, regardless of a direct market value. It is said of them, that they never die in debt, and if such can be truthfully said of anything, I believe it can be said of them.

### *Cost of Keep.*

In the first place, the real cost of keeping them is comparatively much less than that of any other farm stock, for, to make pork a great proportion of the food consumed must be cash grain, and to make beef, butter and cheese, a goodly proportion, while to grow the sheep and place it on the market requires least grain of all, and exclusive of preparing him briefly for market, his living consists very greatly of nibbles here and there, which the bovine and porcine race would never find, much less make use of and which would otherwise go entirely to waste.

I am often asked the question, "What is the cost of keeping a sheep a year?" the cost varies with each year, for while on the "about 100 acres," that we generally use for pasturing 450 to 500 sheep, previous to the recent dry seasons, the same acres would have pastured nearly double that number, thus reducing the cost of their summer keeping nearly half what it has cost the last two or three dry seasons. "Do we have to buy bran or other grain to feed our sheep in order to keep up the fertility of the land our sheep occupy?" We never have had to neither do we expect to. Our richest returns thus far in the hee p line have come from our indirect income. And what is that? In most of our operations on the farm we think we do well if we get a little direct income. If through the agency of our sheep, on grain impoverished lands, we can so recuperate those lands within the space of a few years, that their producing capacity is nearly or quite doubled, and in the meantime harvest from those lands a remunerative crop of mutton and wool, we look upon the renovating effects of the sheep on these lands as an indirect income, and with us the most satisfactory. What other line can the same be said of?

### *Renovators and Recuperators.*

In comparing sheep with clover as a renovator of exhausted lands, I would incidentally suggest, that the man who sows and raises clover, carries on a sort of legitimate robbery on his neighbor who neglects or fails to utilize this more useful plant, it being one that draws much from the air, assimilates and materializes much of its drafts from the elements, and then leaves them as permanent deposits in the soil through its roots.

Perhaps my theory is not well grounded, but after several years of observation in which the workings of the two agents, clover and sheep, on exhausted lands, have been so similarly beneficial, I am inclined to think that the principles

that underlie those agencies, are in some respects similar; at least to the extent that the sheep too, perhaps, inhale and retain elements from the air, and often completing their use for them, leave them as permanent acquisitions to the soil. The fluctuations in the price of pork, beef and mutton of from 2 to 6 cents per pound, and almost as great extremes in the dairy business from time to time, indicates that all agricultural lines have their ups and downs, and under the exhilarating influence of their ups, are well able to take care of themselves and those engaged in them. But it is when the other extreme occurs and the bottom seems to have dropped out of them as far as remunerating us in any way for the time, labor and attention given them and the food consumed in their production is concerned, it is then that we begin to wonder what is to be done next, and even to conclude that the promise of a living is not very flattering from these lines of business.

We take our books and look the pork account over and we find that the most of that 2½ to 3 cent pork has been made from cash corn, to produce which, called for a big outlay of labor on each acre engaged. The honest steer looks us in the face and meekly acknowledges that for similar reasons, *he* too has cost us every cent that there is in him. The cow in the seasons of depression in the dairy business, as we sit down to milk her at regular intervals of twelve hours each, (except the Sunday morning lay off of half an hour,) for ten or eleven months in the year, affectionately switches her soiled tail tassel in our face and occasionally sets her foot in our lap, to express *her* gratitude to us for continuing in her line of business when the remuneration is so unsatisfactory.

The average grain producer truthfully declares that, one season with another, besides the fertility drawn from his farm, his crop has little if any more than paid the costs of producing it.

These items though remote from my subject are presented merely by which to contrast, for as the poet has said: "We learn by *contrast* to admire," etc.

### *A Constant Source of Profit.*

Then we confer briefly with the sheep, and seeing by our looks that we are in a discouraged and fault finding state of mind, they with a unanimous bleat remind us that even though our direct income from them may not have been satisfactory, yet we must remember that we pastured them most of the summer on that hill land that we did not want to plow, and in that wood lot that was so full of wild plants and second growth sprouts that nothing else would eat, and on that lot we bought and seeded, that grain wouldn't grow on any more, and finally turned them into that pasture that the cattle couldn't live on any longer, and yet that they attained to and continued in prime mutton market condition on this style of living. That early in the spring at least half of them presented us with a lamb that did not have to be taught to drink skimmed milk nor be dehorned. That after we turned them out to pasture in the spring, we did not have to again bring them in till about shearing time, when they each gave us their old coats that sold for a trifle over $2 each, and that at a time when there was very little else coming in, and that from this time to the close of the season they require very little of our attention. And then they went right on and reminded us that it was just in those years of the most serious depression in their direct product that we were keeping them

mostly on that grain impoverished land that our predecessor in ownership had partly abandoned, because he could not raise grain on it any longer, but that utilizing it for their pasture for four or five years so completely renovated it that it nearly doubled in value and was again ready for profitable cropping, thus most emphatically demonstrating that *indirect* income that we mentioned before.

Thus having fairly carried conviction with their argument they again quieted down, and we were left to but one honest conclusion, and that was that if our sheep business had been *unprofitable* what line of agriculture had not been even more so? But we were again reminded that to secure its *best* results we must be continuous in it, as it is *the* line that though its market and commercial value be depressed, still as a factor in successful and independent farming it is still as valuable as though on the markets it were enjoying a boom.

### *Hired Help.*

The question of "hired help" on the farm is one worthy of careful consideration and one in which our "new country" differs widely from the "Old." That man who would seek to *develop* labor on his farm for the unemployed, more than what seemed absolutely necessary for the handling of his crops would surely be a novelty, and this perhaps, is justifiable under the present apportionment in which the employed, if paid as per agreement, are thought to get fully their share with the employer. Then as this question relates to my subject, the dairyman must have as help, good milkers, with which, however, this country does not abound.

To plow, sow, cultivate, raise and handle the grain from which the most of our pork and beef is produced calls for a *host* of common laborers, while to attend, provide and care for the sheep requires the least, and thus seems to fit the prevailing economic ideas of the present time, of employing as little farm help as consistency will admit of.

### *Care and Attention.*

To the sheep, there are times when we expect to give our untiring attentions, preeminently during the lamb harvest and at shearing time. But to us those are of such importance that we plan for them in the season as much as we do for sowing cultivating or harvesting our grain. But those once over we are again relieved from conferring daily attentions for the green feed season. In the winter we feed in the morning, shortly after sunrise, again at about ten o'clock. Water at noon, and feed last about one or two o'clock.

In general, the expert workman should not be detained at common labor. It is not economy. The farmer also, who finds himself in possession of an inexhaustably rich soil, may put it to a better use than producing wool and mutton. But we all know that this last mentioned condition of soil does not prevail in one farm in a hundred throughout our state. And we also know that there are thousands of acres being plowed and sowed or cultivated, for a few expensive bushels of grain, that would yield the owners an income fully as good or better, without the labor of annually tilling, if it were seeded and pastured with its capacity of sheep.

Surely it was not old sheep pasture that gave rise to the "New England" story concerning a settlement in the

territory, of Scotch Presbyterians among whom it was the custom of the elders, deacons and stewards to make the rounds of their circuit and offer prayer for its successful maturity over each seeded field.

Coming to one, that, although seeded, looked very barren and hungry, the elder stopped, took in the situation at one sweeping look, and then started on again with the remark: "'Tis useless to stop and pray over that field until more manure has been applied."

That elder had almost enough of the practica about him to make him a good farmer.

Verily sheep husbandry is essential to the prosperity of the nation. If any other nation would give us our wool and woolens, it would be the poorest bargain we could make.

My faith is such in sheep, that I believe that nothing short of 100,000,000 will maintain a healthful condition of our agriculture, and we have but about 45,000,000.

### *Sheep—Prosperity.*

I have in mind an instance in our locality that I wish briefly to note. A. and B. join farms. The portions that join are similar, being hill but not rough land, the line fence simply dividing them. A. has for years pastured his hill land with sheep, at least six years out of eight, and thereby without manual labor, secured an income from those lands more than equal to B's., who having no help of his own, has to hire all done except what his own two hands can do, and who has during this same term of years, plowed and cropped his hill land each year, and if the crop has amounted to sufficient to pay the expense of itself, it has done well. If men will thus continue, with observation as unobstructed as in this case, whom shall I hope to convert from the follies of some of their ways by standing and talking here to-day. But I am at least satisying the conviction of the lady who I recently heard asked this question: "If people will not learn that fire is hot by being burned with it, how shall we convince them?" "Why, by continuing to tell them that it is hot," she replied.

In the instance above mentioned, I know that A. often, as he folds his arms and contemplates the two cases, while his sheep are doing his field work, concludes that if B's. management is satisfactory to himself it ought to be to him. While I suppose that B. as often looks over the fence at "sheep farming," while he turns his hill over and over again year after year and concludes: "Well, that kind of business of letting sheep farm your hills may suit you, but I prefer to plow mine, even though my income from the same is not equal to yours." These certainly are the indicative conclusions to a looker on.

### *Utilize the Hay Crop.*

Another point to be considered is our "hay crop," which by the way is one of our surest, cheapest and most easily and hastily secured crops on the farm. In this we have not known a failure within the scope of my memory. And there is no animal on the farm that will utilize a good hay crop to better advantage (nor I believe as good), as the sheep. In fact, good clover hay is almost a perfect food for sheep. Although for best results they should have more than one kind of food, but the cheap, bulky clover hay, *may* constitute their principal winter ration.

Gratifying feeling of relief! in these days of 50 cent corn and 35 cent oats.

Wonder how the swine herd would thrive on it as a principal diet.

Again consider for a moment the vast amounts of meats that this country is producing, not only enough for our own consumption but seemingly enough for all the countries of the world besides, that cannot produce for themselves. How about wool? We produce but about *half* what we *consume*, the other half having to be imported — of course from countries that can produce it cheaper than we can — nevertheless wool at present prices, I consider it fully as profitable, as our meat production, besides the many advantageous conditions connected with its production over that of meats.

### *One Hundred Per Cent. Profit.*

*Our* sheep business dates back farther than I can remember. Its origin on the mother's side was three superlatively native ewes, that sheared about 2½ pounds of wool each. We have never bought a ewe since, but have sold probably upwards of 2,000 sheep, all of our own production, and our stock in trade to-day numbers 475 all told. A year ago last May we sheared 360 sheep, last May 430, so our flock for the year averaged about 400, from which our books show a direct income of $1,700, besides the surplus numbers we have on hand over our average numbered flock, and an improvement over the original stock with an average of 2½ pounds of wool per head, to an average for the 430 last May of 10½ pounds per head.*

The dairy business of this country is assuming too vast proportions to be ignored, and it is growing day by day in profit, *just in proportion* as system, thought and polish becomes mixed with it as ingredients.

Exactly so with sheep, but with only the *average* amount of those ingredients that generally get mixed with either. I believe the chances are best with the sheep.

The purchaser of our last clip of wool amounting to some over 4,500 pounds, pronounced it the choicest lot of wool that he had ever seen in producer's hands, and was willing to emphatically wager that we would never again produce its equal. *But*, when the time comes that we loose faith in our ability to not only *equal*, but to *improve* on our past efforts, then will "Fairview Farm" take down her shingle and her business will have lost its first prime and most exhilarating principle.

### *Conclusion.*

Then in conclusion. Why do we keep sheep? Certainly not because we have no experience with other lines of stock, as we are continuous producers of sheep, hogs, cattle and grain. And they prove most remunerative to us, all things considered, in the order named.

The dairy business, though disagreeably confining seems to be overdone, especially in the production of bitter, solid, rubbery and indigestible cheese. While for the near future of the beef question, we are with everybody else, hopeful. Still the discouragements of the present and near past need no mention. Of the grain fed to the hog, the fewest fertilizing elements ever get back to the land from whence they came; while the living of our sheep costs us the least, they do the *most* toward keeping the farm clear of foul weeds, tax the soil least that feeds them

*NOTE—For the past year facts will bear out the statement that for every dollar we have put into our sheep they have returned us *two*.

and strengthens it most; are the least confining to attend; cause us the least trouble are the most quiet, contented and easily handled. Keep the farm in the best producing condition, and the dollars that come to us through them, come the easiest of any that find their way into our languishing purse.

*DISCUSSION.*

QUESTION—How will sheep kill Canada thistles?

ANSWER—Always salt them on the thistles and the effect of the salt and continual gnawing of the sheep, kills the thistle.

QUESTION—Why do you think the sheep can be more economically handled than other stock?

ANSWER—Because he needs less grain than either hog or dairy cow and can be fenced in or out cheaper than horses or cattle, and needs less of the farmer's time in caring for him than any other stock, and he renovates worn out lands quicker than any other class of stock.

MR. SNYDER — How many sheep can you keep on an acre?

ANSWER—A difficult question to answer, as capacities of acres vary so with seasons. Can better give the cost of keeping our sheep (500 in number), a year, or the past year, and let each apply it to acres. For the pasturing season, allowing $3 per acre for the land thus used, which, however, is doubly a just allowance compared with land let for cultivating purposes, and computing value of food consumed during the close season, our flock has cost us practically $900, while our income from them has been doubled that amount, while the flock in numbers and quality is unimpaired.

QUESTION—Is corn a detrimental food for breeding ewes?

ANSWER—Not with plenty of exercise. But a certain amount of feed with exercise might be seriously detrimental if fed and the exercise omitted.

QUESTION—You speak of exercise being necessary with ewes to insure success with lambs. My ewes had the run of a 20 acre field adjoining their yard, and yet the lambs were inclined to be sluggish and dish-raggy, and showed considerable lack of vitality. Can you assign a cause?

ANSWER—I can assign a cause, whether absolutely the cause or not I cannot say. In our own case, breeding upward of 200 ewes, were our ewes to have only access to exercise, during the winter months, I should look forward to the lambing season with considerable suspicion and dread, expecting many representatives of the above mentioned class of lambs, but a goodly portion of our ewes' rations, or an important portion, during the winter months, is a certain amount of exercise daily, except when it storms, given or forced upon them, by drawing a shock of corn the first thing in the morning, about half a mile away from the buildings. They will go there after it. They soon learn it and need no driving. Thus, with quiet handling at the buildings, average treatment otherwise, vigorous sires and this extra exercise business, our lambs almost without exception, come to us vigorous, and needing but little extra care.

QUESTION — What about washing sheep?

ANSWER—It is a thing of the past. It is heathenish to both man and beast, and at best furnishes but an imaginary and unjust standard by which to measure the values of other wools by. The sooner it is abolished the sooner will a

basis just be established for marketing wools.

QUESTION — Have you fed silage to sheep?

MR. CRAIG — Yes, I have fed corn and clover silage to breeding ewes and fattening wethers. Corn silage gave good results in each instance. When fed with cut corn fodder and whole corn a pound of gain with fattening wethers cost only 3.7 cents. At odd times the wethers seemed to care little for the silage but that may have been due to the lack of variety in the ration. It is doubtful if silage can wholly take the place of turnips for wether feeding. Both these foods should if possible be available to the shepherd. For breeding ewes I found silage a capital food being fully better, all things considered, than turnips. While feeding it the ewes were thrifty. The clover silage was relished by both the breeding ewes and fattening wethers. When put into the silo uncut and fed so, the sheep will leave considerable refuse; more of it than when fed clover hay.

QUESTION — Does it pay to feed grain to the breeding ewes?

MR. CRAIG — I believe it does. Let me tell you of the experience of two breeders in this matter. One had a flock of 150 ewes. He stinted them, giving them no grain whatever. A carload of oats was shipped from his farm because he considered them too good for sheep. From these 150 ewes only fifteen lambs were raised last year. That is an extreme case but it shows in a strong light the relation of grain feeding to profitable lamb raising. Another breeder in the neighborhood had 47 breeding ewes and from these he succeeded in rearing 57 lusty lambs. His ewes were well fed and received grain. You will find that ewes fed a little grain will give you a heavy clip of sound wool and lusty lambs. If the ewes go into winter quarters in good condition in the fall do not give them any grain until a few months before lambing; I would rather feed good oat straw and some grain than any other fodder I know of and no grain.

QUESTION — Would you advise using ram or ewe lambs for breeding purposes?

MR. CRAIG — A robust ram lamb may serve twenty or thirty ewes. More than that number will check the growth of an ordinary ram lamb. I have used a ram lamb to serve as many as sixty ewes and had an excellent crop of lambs the next year. The lamb was not injured in any way. He was fed during service 2 or 3 pounds good hay 3 pounds of roots and ½ pound of heavy oats. By using a ram lamb on a limited number of ewes you do him no harm and you are able to criticise his stock getting qualities the next spring before using him on all your flocks. I do not think it good practice to breed ewe lambs unless they are very early and forward in growth.

QUESTION — How long may a ewe be kept in a breeding flock?

MR. CRAIG — As long as she continues to raise a good lamb each year. There is a greater range of variation in ewes than in any other of the domestic animals and hence the possibilities of selection are exceedingly great. Some ewes will continue to be profitable until they are ten years old; others become unprofitable at four years of age. I know a grade ewe eight years old that has yielded her owner $100 in lambs and wool and when in her eighth year she had triplets and they were all fairly well nourished. By keeping a record

each ewe of the flock it is an easy matter to cull out the the unprofitable ewes each fall and fatten them for the butcher.

QUESTION — What is your system of keeping a record?

MR. CRAIG — We number all our sheep with small metal ear tabs. The ewes are all entered in a book — opposite the name of each ewe we have a column for the time of service; then another for the time when due to lamb and another for the actual date of lambing. We number and weigh each lamb as soon as dropped and these are entered with the sex in three columns following the others. The weight of the wool clipped by each ewe is also noted. In the place left for remarks we note the conditions of the udders of the ewes at the time of lambing and determine their milking qualities by two examinations at different periods, and the growth of the lambs. When fall comes we cull closely with the facts we have gathered as a guide. Age alone cannot be relied upon.

QUESTION — When is it best to have the lambs dropped?

MR. CRAIG — If you have good dry quarters for your sheep you can hardly have the lambs come too early for profit. If the lambs come strong they do not require warm quarters. They must be kept dry above and under foot. As a general rule I like to have them dropped a week or so before the grass is ready for them. You can rear a larger percentage by having them dropped in the shed as you can attend to the wants of the weaker ones easier.

QUESTION — What treatment do you give the ewe about to lamb?

MR. CRAIG—As soon as due to lamb put the ewe in a small pen by herself in a quiet place. Do not attempt to assist her until you are convinced that she cannot deliver the lamb without your aid. When dropped dry the lamb and above all things see that it gets a good drink of its mother's milk. If it is the first lamb the ewe has had it may be necessary to hold her to give the lamb a drink. Sprinkling a little salt over the lamb is a good idea to get the ewe to lick the lamb thoroughly dry.

QUESTION — What points would guide you in selecting a ewe for breeding mutton sheep?

MR. CRAIG—Just let me tell you the kind of lamb I like to have to feed and then you will understand why I want certain points in the ewe. I have noticed that the broad faced thick necked lambs with long even bodies make the most rapid progress. Some admire the short bodied lamb but I would rather have one that is considered long between the legs. It is desirable also to have them plump behind and well filled out in the inner thigh. You can fill out a fairly long bodied lamb better than you can a short bodied one. The butchers like such length between the legs as this is the most valuable part of the carcass to them. Now the ewe that will produce such a lamb, when served by a good type of mutton ram, is long and low, straight and broad backed with all the indications of good milking qualities. A ewe can, during the time the lamb is with her, do more to determine the profitableness of the lamb than you can afterwards. A good milking ewe with the sympathy of the mother strong within her will always raise a profitable lamb.

QUESTION — What course of treatment do you consider the best for destroying ticks on sheep?

MR. CRAIG — After the ewes have lambed I would shear them as soon as the weather would permit. In addition to aiding you in getting rid of the ticks early shearing is a good practice for the reasons that the ewes will nourish their lambs better and moreover the wool will be of a better quality — and you prevent it from dropping out. You are safe in concluding that two weeks after the time of shearing the ewes, the lambs that run with them have become the hosts of the ticks that were before shearing on the ewes. Thoroughly dipping the lambs in tobacco solution, under this system of management will completely destroy the ticks. Do not delay the lamb dipping as the ticks may seriously check the growth of the lamb?

QUESTION — How do you make this tobacco solution for dipping?

MR. CRAIG — As a dipping fluid I use tobacco and sulphur. Some of the manufactured dips are good, others vary in strength, a few are more or less dangerous to use and all are expensive. As I said shear your ewes, as early as the latter part of May if possible. Then if you have about 50 lambs to dip take ten pounds of tobacco stems and boil them thoroughly for a day. From these you will get about six pints of very strong tobacco juice. In a pail of warm water stir three pounds of sulphur until it becomes of the thickness of cream. A tin lined tub or box will do for the dipping. To this tobacco juice as it is being used add during the progress of the work four or five parts of very hot water and also add small quantities of the sulphur. This hot water besides diluting the juice enables you to keep the temperature of the dip at 102° to 104° Fahr. at which temperature it is most effective. You could dip more lambs with this quantity of fluid but it is better to change it often and keep it clean. It is claimed for the tobacco that it will kill the nits as well as the lice and my experience appears to justify the claim. For scab, tobacco and sulphur are also strongly recommended used in the proportions of 1 pound of tobacco and 1 pound of sulphur to 5 gallons of hot water.

QUESTION — If sheep are fed sulphur will it kill the ticks?

MR. CRAIG — No, I think not. I used to feed our flock sulphur with salt but do not do so now. It seemed to me to bring on an openness of the system that gave rise to frequent colds.

QUESTION — At what age would you wean lambs?

MR. CRAIG — When from 12 to 15 weeks old. Often when a ewe has twins and she cannot supply them with the milk they need for growth it is advisable to wean one of them as early as possible. The milking qualities of the ewe will have most influence on the time of weaning. When you wish to wean the lamb early they should be taught to eat grain as soon as they can be induced to eat it. A nice piece of aftermath clover with some oil meal and cornmeal (1 of oil meal and 2 of cornmeal) will give a good unchecked gain.

QUESTION — Would you feed grain to lambs before weaning?

MR. CRAIG — Yes sir. In an experiment we carried on at the experiment station I found that it paid to feed grain to the lambs as early as they would eat it. I put two lots of lambs (three in a lot) on good blue grass pasture with their dams. To one lot of lambs we fed grain consisting of 1 part bran, 1 part cornmeal and ¼ of a part

of oil meal night and morning. The other lot did not get any grain. The grain fed lot made a gain during ten weeks of 27 pounds more than the other lot at an extra cost of 57 cents. The figures gathered from the experiment showed that the lambs made the greatest gain on the least food during the first half of the period so that it pays to feed the grain just as soon as they can be made to eat it.

QUESTION — How do you teach the lambs to eat grain?

MR. CRAIG — When the lambs are about two weeks old if they have been dropped early and are yet in the shed we divide off a corner with a lattice division made so that the lambs may pass through but the ewes cannot. In the corner so partitioned off from the rest of the pen we place a small trough in which a little grain is sprinkled. If the lambs do not begin to eat a little themselves we take one of them and force a little of the meal into its mouth. If the grain mixture consists of oil meal and cornmeal it will relish it and soon this one will be leading the others to the trough. In the field we make a small latticed pen to keep the ewes from the grain trough which is placed in it and this we put where the sheep are in the habit of gathering to get in the shade or for other reasons.

QUESTION — For feeding a flock of breeding ewes during winter what foods would you recommend?

MR. CRAIG — My system of management, where the conditions are suitable for following it, is as follows: As soon as the ewes are put in the sheds in the fall I would feed them ¼ pound whole oats per head. When the season is half over and lambing time approaches I would feed to each ewe daily ½ pound of bran instead of the oats. As coarse fodder I would advise feeding oat straw, corn fodder and hay. Three pounds a head per day will be about the quantity of these that a ewe will eat. More corn fodder will fatten them too highly. Along with these it would be well to feed three pounds of roots or ensilage. In any event never feed much roots before lambing time. With a ration of oat straw roots and the fore mentioned grain I have been keeping part of our flock of grade Shropshires in good condition at a cost of less than one cent per head per day.

QUESTION — Is it not so that sheep will do well only on high rolling pasture land?

MR. CRAIG — Some breeds will thrive only on high land but just the opposite conditions are most suitable for others. It is commonly thought that a farm must be of a certain aspect and soil texture to become a successful breeding ground for any sheep. There are about ten breeds of sheep in America and each one of these will thrive best under special conditions of environment so that it may be said that there is not any district in America but could furnish a home to some one of these breeds. For instance such breeds as the large Lincoln and Leicester do best on heavy low soils. Others such as the Cotswolds and Downs thrive best on lands of medium altitude while following these come the Merinos and for the highest table lands and mountain sides the Cheviot and Highland breeds are most suitable. To the best of my knowledge of our conditions and the characteristics of breeds every section of our continent may hope to become a profitable breeding ground for sheep.

QUESTION — Have you any experience

with the English rape at the experiment farm?

PROF. HENRY — Yes, we had a small field that Prof. Thomas Shaw of the Ontario agricultural college pronounced a fine crop and equal to that usually produced in Canada. While further experience may show that this crop will not generally succeed with us it certainly promises most favorably in this first trial and a thousand Wisconsin farmers should experiment with rape in a small way next season. It is par excellence the feed for fattening sheep and lambs in the fall. Just now most fortunately a deep interest is being awakened in English breeds of mutton sheep. If we are to keep these animals to the high standard at which we find them and produce mutton equal to that of the English markets we must improve our present methods of caring for sheep, and add to our very limited list of feed stuff suitable for them. Our limited experience shows that rape may possibly become a valuable crop for sheep-feeding in this state.

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# POULTRY FOR THE FARM.

BY MRS. IDA E. TILSON, WEST SALEM, WIS.

*A Host of Questions.*

It is said a child can ask questions that a philosopher cannot answer. Reverse positions, and how will the tyro succeed when an expert is inquirer? There were sent me, by our superintendent of institutes, several pages of poultry questions, and an essay requested that I should classify and answer them. Satisfactory replies to inquiries virtually ranging from grave to gay, from scientific to practical, and from "banty" to shanghai, might require "Wood's Natural History," "American Standard of Excellence," and "Encyc. Britannica" combined. My department of the poultry business is egg production for food, and my affairs are conducted not as a professional fancier, but as any farmer's daughter may do. Incubators, capons and packing will, therefore, be relegated to dealers and shippers.

*Warm Quarters.*

Nothwithstanding our amiable and progressive weather prophets, there are usually long winters, at this latitude, hence the hen-house, whatever its style, should be warm. My houses are double boarded, one filled between with sawdust, the other having tarred paper intermediate. The former building, with its thick absorbent walls, is both warm and dry. Paper arrests all breaths, and their accumulated moisture frequently freezes in hoar festoons, which weep themselves away on 'thawy' days. A hen, merely beholding such frost and dampness, will shiver. But that kind sawdust, which, instead of biddy, takes the moisture into itself, is slowly affected by dry rot, while tarred paper

certainly repels insects, and "as snug as a bug in a rug," is no greater bugbear to housekeeper, than as snug as an insect in a crevice, is to poulterer. With sawdust and paper linings it is evidently a case of paying your money and taking your choice. Satan surely finds some mischief still for idle hens to do. A floorless house, well sanded, permits biddy to 'kill time,' and to secure exercise by scratching, and may keep her in practice for the spring flower-bed. A floor affords rats and insects another refuge. Good stone foundations secure safety, and outside feeding, under a shed, attracts rats away from the house proper. Simple interior arrangements, movable nests and roosts, and a judicious use of coal oil, and pyrethum will free house-cleaning of its terrors. Sawdust has been my only nest filling for some years. To pack hay or straw so it will not become 'humpy,' is more than packing a Saratoga trunk. Round perches resemble tree branches, Nature's roosts, and present no sharp angles to biddy's feet. Flat perches, wide enough to support her whole body, are comfortable for a heavy fowl. Summer nights, the ideal hen house will, by arrangement of doors and removal of windows, approach a draughtless shed. In midwinter, little outside air is needed. For intermediate seasons, I have apertures at the base, because top ventilation is more apt to call down roup than blessings on chickens' heads. A building 12x10, with open shed same size attached, will accommodate forty and even fifty fowls, perhaps as many as can agree and thrive in one place. Houses are for roosting and laying, for repose and thought. Sheds are invaluable for sunshine and sociability.

***Good Layers.***

To get layers healthy and early, matured hens need rather be sought than perfectly marked ones, since, happily, dress does not govern ability in either brute or human form. All varieties of Leghorns are unexcelled layers. Evidently Mr. Grimes' legendary hen was a Dominique Leghorn.

"For ten long years she lay.
At morn and eve, old Grimes an egg,
But none the Sabbath day.
Her back was brown and speckled o'er
With spots inclined to gray.

As general-purpose fowls, none stand higher than Plymouth Rocks, closely followed by Wyandotes, less hardy and intelligent, but more stylish, gentler, and very delicate eating. Both these and Cochins are excellent sitters and mothers, when not too heavy A Plymoth Rock may be rather independent, but let her have her own way, and it will generally prove the right way. Instead of removing sitters to a separate room, I now allow each to retain her chosen nest, protected from intruders by a temporary door, consisting of a shingle, held in place by a brick, resting on the little platform which extends in front of all the nests. (Patent not applied for.) A dozen hens can be set at once, and every morning be taken off together for food and water. Two or three substitutes are kept in training on glass eggs, and if not needed to replace ugly or restless sitters, are duly discharged. After a few days firm discipline, all learn regular habits, and no further watching is necessary. Something like Tennyson's brook.

Men may come and men may go,
But *they sit* on forever.

***Intelligent Selection.***

Since "like produces like," neither the largest nor the smallest eggs are best for setting, because neither giants nor dwarfs are desirable. Medium sized

eggs should be cultivated, as they best fill shipping boxes and cooking rules. A flat or ill shaped egg will break easier than the perfect oval, Nature's arch. If a sitter accidently breaks an egg, her nest must be repaired, and smeared eggs washed in warm water and wiped, as closed pores will suffocate the embryo chick. I am as expeditious as possible and otherwise never disturb a nest, not even to test the fertility of eggs. To sprinkle eggs may be necessary when a sitter is so confined that she can never bathe her feet and trail her wings in dew. One enterprising hen made a stolen nest of a disused horse collar, lying on a bare board shelf, and presented me 18 chicks; another proud mother marshaled 16 from the hay mow. Both locations were certainly high and dry. Even if that skin lining the shell, dries, in incubation, the shell itself grows brittle, and it would seem that any chick worth raising might make his own way out, and we have "the survival of the fittest." The eggs of a mature hen, two years old, are more satisfactory for hatching than those of a pullet, and I prefer the layers not to have been unusually stimulated. Though fresh eggs are always preferable, they will retain fertility for six weeks, if packed in bran and set in a cool place. Our grandmothers said points down, philosophers say heads down, and biddy leaves her egg side down. My own experience reveals no great difference in results. Some recommend that the infertile eggs left after hatching, be boiled and given to the chicks. Other poulterers pronounce them very unwholesome. They always seemed to me a dangerous subject for investigation. Until every hen-house has an almanac, and biddy is educated, she will sometimes sit unseasonably. A humane cure is confinement in a comfortable jail; without vestige of a nest, but with just enough egg-producing food to make her scratch and long for more.

### *Not Always Successful.*

Once I raised all but one of 200 chicks hatched, and generally being successful, was inclined to think others careless when they complained of weasels and rats. After a long procession, however, of right-minded, rat-hunting cats, which slept in the hennery if they chose, my dear kitten proved an aristocrat, fond of spring chicken. Later three hawks selected my downy darlings for family supplies. Grown thin and almost demented, from long watching for them, I called in my neighbors and acquaintances, and sold 150 fine chicks "How are the mighty fallen!" Had I owned a harp, might have hung it on our willow tree, but instead, girded on my big apron, that was at hand, and raised 25 more chicks, which survived, protected by the higher grass.

### *The Best Feed*

There are no safer foods for little chicks than milk curd and bread and milk. Hard boiled egg perhaps once every other day is good, but the cheaper corn meal must gradually replace these. Soon, one-third of bran, ground oats, rye or beans, and two-thirds corn meal will be relished. To neither chickens nor hens do I ever give any sort of meal without scalding it. Salt, pepper and other spices, when used, are mixed dry through the dry meal before wetting. Wheat is a safe food, to be fed as soon as it can be swallowed, and meat may be given with care that it does not prove laxative. Corn is preeminently the fattening food. Wheat, buckwheat, rye, vegetables and

meat, are bone-forming and egg-producing. Barley is a favorite in England, because standing midway between wheat and corn, contributing somewhat both to eggs and flesh. I feed little chicks five times a day, larger ones three times, and grown fowls twice. A quart of grain per day for every ten hens, has been found a satisfactory winter ration. To this I add, each once in three days, chopped vegetables and fine charcoal, next cooked meat and gravel, followed by meal pudding and bone meal, forming a circular, rotating program. Picking the kernels from a few ears of corn daily, will furnish amusement, and variety not only spices a hen's life, but is indispensable for building her frame and fame. Oat hulls are so dry and harsh, they are rather indigestible. Whole oats, though an excellent summer food, cannot, therefore, be recommended during winter's trying confinement. Raw bone *is* bone, with its phosphates. Burned bone is practically a good but expensive form of lime and charcoal. A half ration of grain will suffice for summer with its insects and grass, but particular attention must be given food in moulting time, when I feed more pudding than usual, as it is easily digested, and add sunflower seed and corn for their oil.

### *A Nourishing Drink.*

Milk, if sweet, is a perfect food and model drink. A fermented sour is not identical with a natural acid, like fruit juice, hence sour milk freely used, needs a little soda added or a slight scalding, else it may prove too laxative. Lime water can be given in excess, but tried for a day or so at a time, is an excellent regulator of the bowels. I would allow poultry warm water in winter, just as I would folks the same privilege, because digestion is helped and comfort imparted thereby. Why a hen will drink filthy, stagnant water, I do not know, unless because she lacks a scientific education, and has never heard about germs and microbes. Prevention meets this case better than philosophy does. When hen houses are opened mornings, their thirsty, hungry inmates rush in all directions, eating and drinking where they can, unless water dishes and feed troughs are previously filled and conveniently placed. Early and habitually satisfied with pure water and proper food, hens certainly are less ravenous for impure water and rubbish. The Douglas mixture, ½ lb, sulphate of iron and 1 oz. sulphuric acid. dissolved in 2 gals. of water, one teaspoon of this mixture to every pint of drinking water, was formerly very popular as a tonic. Decapitating rather than doctoring sick fowls, seems to be the modern tendency, since $2 worth of time and medicine are generally required for curing each 25c. bird. Decapitation applies also to scaly-legged, egg-eating, roaming fowls, and all morbid conditions. If eggs are gathered often, they are not only fresher, but if in addition, glass nest eggs are used, the egg-eating habit probably will never be learned. The Japanese egg gourd, when grown only to a proper size, on ground not too rich, is a cheap and good nest-egg. It is thought that a wet location develops scaly legs, and no doubt poor fences tempt roamers. But Polands and Hamburgs,

> Like Mistress Mary
> Seems quite contrary,

and wander for the sake of wandering, unlike Leghorns and Plymouth Rocks, which are merely good foragers. Cochins and Wyandottes, comparatively light

feeders and easy keepers, can be recommended for confinement.

*Which Shall it Be?*

In both France and China, where cooking has been brought to great perfection, black-legged and white-legged fowls take precedence of yellow-legged. Although yellow meat looks tempting, nothing can be more delicate than the white skinned Houdan, or jucier than the dark skinned Lan Shan. Perhaps methods of fattening and cooking are as important as tints of flesh. Poetry and music have entwined themselves about the delightful subject of fresh eggs. Shakspeare knew a poor from a good egg, while Mozart in one of his minuets, and Hayden in his Twentieth Quartet incorporated the joyous notes that announce a new-laid egg. But there are eggs and eggs, and each variety can, like a colt, best be valued after broken. The white-shelled are attractive for boiling, but the dark shelled have more substance, and two dark eggs will generally do the work of three white ones in cakes and custards. My Leghorn and Wyandotte pullets usually lay well when five or six months old, while Plymouth Rocks are about a month later; when a pullet has reached this period, she is in her prime, and for two years thereafter should lay over a hundred eggs per year. If active, red-combed and bright-eyed, it may be best to retain her another year. Could we put our hens asleep through the winters, like bears and coons, no doubt summer eggs would be most profitable and popular. Since our hens do, however, wake early and eat often through cold weather, we may as well, by judicious feeding, produce some eggs to pay for our trouble. A frozen comb must be painful and debilitating, and hinder egg-production, though I never dared to try any remedy, except sometimes a very little glycerine.

*Keep an Account.*

By all means keep an account with the hens. It will prove that all the way from nothing to $1 a hen per annum, can be made. For the first time, the balance on my books is against me. My pullets, purchased instead of raised by myself, are fine looking birds, but evidently, were not early impressed that their mission should be to lay. Or, perhaps, the Guinea fowls kindly given me, and the peacock loaned me, for hawk extinguishers, have scared the hens themselves.

Like an old-fashioned minister who usually preached twice a day from the same text, informing his hearers in the morning that he could not exhaust his subject then, but would try to do so in the evening, I must leave some topics untouched, though without any promise as to where and when I shall exhaust them.



# EVENING SESSION—MARCH 18th.

The Institute met at 7:30 p. m.

Prof. W. D. Parker in the chair.

Music. Mixed quartette.

PROF. PARKER—The Farmers' Institutes of Wisconsin, have now been in progress five years. These institutes are free for all, no one is restricted from participating. They have become a great educational factor in our state. Educating the farmers, popularizing our state university and advertising the bountiful resources of Wisconsin.

Any organization that will bring farmers together to discuss better ways and methods upon the farm, will be fraught with good. We see all other vocations assembling together in convention, using their brain as well as their brawn in eager efforts to keep abreast of the sharp competition of the times. The farmer who laughs and sneers at the farm institute, refuses to study, read and think will have a chance to act as "rear guard."

The institute is the farmer's opportunity, and will do more to educate and encourage him than anything heretofore offered. If every farmer and his wife in Waupaca county could attend an institute and give their lessons of experience, if successful, all would receive the benefit; if a failure, some one would perhaps point out a remedy. We must banish the isolation of the farm, it is fatal to advancement and progress. Every school district should have a co-operative institute, which should meet once a month and maintain the interest and prepare the way for the annual county institute. An organized educated force of the best thinking, progressive men and women scattered throughout your many townships, would uplift and elevate agriculture to its proper position.

It gives me pleasure to introduce as the first speaker of the evening, Prof. Henry, Director of our experiment station.

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# WISCONSIN SYSTEM OF AGRICULTRUAL INSTRUCTION.

BY PROF. W. A. HENRY.

The system of agricultural education adopted by the University of Wisconsin posseses features worthy of consideration by all citizens of our commonwealth. It has attracted the attention of educators and others interested in progress from near and far, and I sometimes think has been more studied by non-residents than by those who give it their support and enjoy its benefits.

Perhaps the reason that it is not better understood and appreciated at home,

is in some measure chargeable to the University authorities. We have not always used every opportunity possible to present the advantages of our system and make it understood by those who are in position to receive its advantages. The institute platform and the institute Bulletin offer a grand opportunity for informing our farming population of just what we are doing for the advancement of agricultural investigation and agricultural instruction.

Our system as now developed, is triune, the three factors being:

I. To develope agricultural science.

II. To educate youth in agricultural science.

III. The spread of agricultural knowledge throughout the whole farming community.

The first division of the system comes under the title of the Experiment Station. Through the publication of its annual reports, our station has already become quite well known to all reading farmers of the state. Its origin dates back to 1866, when Dane county secured a grant of lands made by the general government to the State University, by giving $40,000 which was used for the purchase of land for a farm and the erection of farm buildings. Upon the farm purchased through Dane county's generosity, experiments were started at an early date, Prof. W. W. Daniells having direct charge of the work. The first aid to investigation was by the legislature of 1881, when $4,000 were appropriated for experiments with amber cane and the ensilage of fodders. In 1883, the legislature increased the income of the university, and provided for the establishment of an experiment station. At that time there were not half a dozen experiment stations in the United States, and though we did not establish the first one, we certainly may be classed among the pioneers. Recognizing the great need for a better study of our agriculture, the general government in 1887, very generously donated $15,000 annually to each state in the union for investigations in agriculture. This sum, and the appropriation from our own state form the fund which maintains our experiment station. With unrivalled generosity our state prints annually 15,000 copies of the station report, and 10,000 copies each of the quarterly bulletins. These reports and bulletins are free upon application, so long as they last, to every farmer in the state. We now have the names of over 8,000 farmers on our mailing list, to whom the reports and bulletins are regularly sent as soon as issued.

### *What the Station Workers Are Doing.*

The station force consists of a director with four professors, two assistants, a farm superintendent, and more than a half dozen other employes. The leading features of our work may be described as follows:

Besides general oversight of the station work, the director has chosen pig feeding for his special line of study. Experiments have been conducted to note effects of feed upon the flesh and bones of pigs, the quantities of different feed required to make a pound of pork, the value of cooked and uncooked feed, etc. More than a year ago a long investigation was begun to ascertain, if possible the amount of food required to maintain a pig at different ages and weights, and the additional amounts required to produce a pound of gain in weight. Although we have enough figures on hand to fill a large book if all were printed, some years must yet elapse be-

fore we dare strike averages which will give the conclusions permanence and value.

Dr. Babcock, besides having charge of the chemical laboratory, has thus far given most of his time to milk investigations. His discovery of fibrin in milk attracted the attention of scientists, and helps explain some of the peculiarities of this most complex fluid. The doctor is best known through his invention, the Babcock Milk Test, which I believe to be the most valuable invention ever brought out by an experiment station, and one which will be worth millions to our dairy interests. Every farmer who keeps a half a dozen cows, cannot afford to be without the Babcock Milk Test.

Prof. F. H. King is working faithfully studying the movements of water in the soil, how much water is required by growing crops, and how it can be best conserved to them, He has a most difficult problem, and we must be patient in looking for results. His investigations on the construction of barns has received favorable attention, while Bulletin No. 28, upon the construction of silos, has received praise on all sides as most timely and well written.

Prof. Goff has planted an orchard of hardy fruits, the trees coming from Siberia and other parts of Asia, as well as Russia. To these he is adding all of the more promising hardy varieties originating in this country.

Mr. Craig has just come to us, and will take up the very important subject of sheep husbandry. When we learn that in 1880, Wisconsin had 1,300,000 sheep, and in 1885 less than 900,000, I think you will agree with me that it is time something was done to place the sheep interests of our state upon a firm footing. The motto of our station is 3,000,000 sheep for Wisconsin, without driving out a single horse, cow or pig.

Mr. Woll has given his time largely to a study of the silo and its effects upon milk and butter production. He is also studying the sugar beet. This spring a thousand pounds of sugar beet seed were distributed to as many different farmers in the state, and when the samples come in this fall we shall know pretty well which portions are best adapted to the production of sugar beets. I do not believe there is a better state in the whole Union, for producing beet sugar than Wisconsin, and if we only proceed judiciously, I am sure capital will seek to locate sugar factories within our borders in due time.

Mr. J. W. Decker, the latest addition to our station force, gives his time largely to cheese investigations.

Though the range of subjects under investigation by us is small compared with the whole list, I think it will be conceded by every thoughtful person that each line we have in hand is an important one, and that it is wisdom to study a few subjects carefully, rather than lose ourselves among a multitude.

### *The Instructional Work.*

The second division of our system calls for the education of youth in agricultural science, and to accomplish this, we have laid out several courses. Our long course is the equal of the other university courses, and prepares a young man in agriculture by broad, liberal training. It is especially helpful to young men who may wish to take up the teaching of agriculture or the work of experiment stations. There are scores of young men who intend to become farmers. but first desire a good college education, and can find the

means as well as the time for securing it. All such should carefully investigate the merits of this course.

*The Short Course in Agriculture.*

Our short course calls for the special attention of all farmers' sons who desire the largest amount of agricultural training in the shortest possible time. It is especially designed to help those young men who can spare a couple of winters from home, but who cannot leave the farm during the busy season. If you can imagine a farmers' institute lasting sixty days for two winters, held at the state university, with its books, apparatus, and equipments for the purposes of illustration and helping those in attendance, you can get some idea of what is possible for a bright young man to obtain who may come to us. This course is attracting attention from far and near, and educators have come long distances to study more carefully its peculiar features. Its merit attracted the attention of the Hon. John L. Mitchell, of our state, who in his love for agriculture, and his desire to benefit his fellow men, has generously provided twenty scholarships of $50 each in the short course. These scholarships go to the graduates of our country district schools. It is impossible to calculate at this time, the far-reaching good of Mr. Mitchell's splend d gift.

*The Dairy Course.*

The dairy course has become exceedingly popular. Though established but two winters ago. January, 1891, brought to us 72 young men from as far west as Kansas, and as far east as Canada and New York, the majority, of course, being from within our own borders. This course lasts twelve weeks, and promises to be of the highest value in helping young men to perfect themselves in the care and management of cheese factories and creameries. When the dairy school building, almost a college in itself, now under construction on the University grounds, shall have been completed, we will have the finest dairy building in the world. I need not tell you that this is the Wisconsin way of doing things. She takes second place to none whenever a movement is made to advance her agricultural interests.

The instructors for the educational department are drawn from the experiment station force for the most part. I believe that a good investigator is usually a good teacher, provided he instructs on those subjects in which he is deeply interested, and is not called upon to do too much work as a teacher. The young men who come to us for instruction are brought into close contact with men who spend the greater part of their time working on agricultural problems. Some of our instructional work, especially the practical side of dairying, is given by persons employed especially for that work.

*The Farmer's Institutes.*

The third feature of our unique system is the spread of agricultural knowledge throughout the whole community, through the medium of the farmers' institutes. The institute is just as much a part of the University and the agricultural department as the experiment station, or the teaching of agricultural studies within the college walls. Every person who attends an institute is a student of the University as much as though he had registered with us at Madison. The institute system is based upon the idea that knowledge should be as free as air and water, and that our farmers are anxious and willing to avail themselves of everything that is useful

and will help them to better follow their vocation. Many years ago the farmers began coming together each winter for the purpose of discussing agricultural questions, and making themselves better farmers and better citizens. These gatherings were under the name of grange meetings, farmers' clubs, meetings of various state organizations such as the State Agricultural society, the State Dairymen's association, etc. Each of these filled its mission and has done a great work, but the institute managed as it is from the University as a central point, gathers together all the great agricultural forces of the state into harmony, and carries more information and distributes it better than was ever before possible.

*The Institutes Have Come to Stay.*

When first started there were those who expressed the opinion that, though popular for a time, the farmers' institutes would soon die out, and there are those within our borders to-day who still believe it short lived. From the first I have affirmed the contrary, basing my reasons upon my knowledge of Wisconsin farmers and human nature in general, and I have seen no cause to change my opinion. When the horticulturist ceases to care for horticulture, when the horseman ceases to care for the horse, when the stockman's eyes grow dull as he listens to some practical paper on the care and management of our domestic animals; when men are so well posted in the growing of farm crops that no better methods can be employed and no larger yields obtained; when the owner of 160 acres of good Wisconsin soil is content to doze over the winter fire and care for nothing outside his boundary fences, then there will be no demand for the farmers' institutes in Wisconsin, but until such a time comes the institute has its place among our educational factors. My only fear is that interference may come from those who would rather farmers should not gather in meetings of this kind, and grow intelligent in the discussion of all things that work for and against them; or, perhaps trouble may come through the jealousy and enmity of a few who would ruin where they cannot rule.

And now in closing let me review briefly the salient points in Wisconsin educational system.

*The System Summarized.*

At the State University there is situated the experiment station with its corps of investigators busy upon some of those problems of great importance to our agricultural advancement. Associated with these are other teachers, and the whole make up the instructional faculty to help such young men as may go up to Madison for the study of the art and science of agriculture. From this same source, reaching out all over the state is a system of instruction in agriculture carried right to the very homes of the farmers themselves. Through this system every farmer in the state becomes a member of the University, receiving help and encouragement from it year by year. Through the institute bulletin and the reports of the experiment station, the latest scientific facts and the best practices in agriculture are at once brought to the attention of the farmers, instead of waiting the slow process of sifting down to them as was the case in earlier years. Our system in its whole and in its parts stands without an equal in any state in the Union. Wisconsin farmers are already proud of it, and when they come to understand it better and learn more fully its beneficence, will appreciate it more highly than they have in the past.

# ADDRESS.

BY DR. T. C. CHAMBERLIN, PRES. OF THE STATE UNIVERSITY.

*The District School.*

*Ladies and Gentlemen:* I regret very much that Mr. W. H. Chandler is not present to discuss the relationship of the common school to the farmer, for I think there is no more important question before this country to-day. I know of no subject within the range of educational problems that more strongly commends itself to the careful consideration of educators and citizens alike than the proper development of the common district school. We have in our cities fairly well developed systems of education. We have a complete gradation from the primary to the intermediate school, from the intermediate to the high school, from the high school to the university, but until the present year there has been no such definite succession of courses before the boys and the girls of the country.

Any system of education, to be entirely satisfactory, must have consideration of the relationship of the child to his future occupation. Education must be adjusted to the environment of the child if it is to have the highest degree of vitality.

There should be a vitalizing relationship between the work of the shop, the field and the school-house. This is being partially brought about in our cities by the introduction of manual training, but in the country this has been neglected.

*Knowledge Leads to Better Work.*

The boy studies his grammar and geography, but he does not study the plants with which, as a farmer, he must deal; he does not study the animals he must care for, he does not study the earth beneath, or the sky above; his school work is entirely apart from the work of the home, and of the field, and they do not vitalize each other. The study of the life and purpose of the plants should be followed in the rural schools, the same of animals, of the soil, and of the air—all those things that the country boy comes in contact with every day. In these things are resources that will vitalize and enliven his intellectual processes and give him a new view of life. When I hoed potatoes upon the farm, I thought myself merely dealing with homely plants. In my maturer judgment of to-day, the potato plant is a more wonderful production than Niagara Falls. Those tubers on exhibition there are developed in a peculiar way, they are neither root nor fruit. They are things in which children are inherently interested, if explained, and a study of such things will vitalize the otherwise dull work of cultivation.

When I was a boy I used to go through the cornfield and pull out the beautiful silks and carry them away by the armful. In the fall I noticed there were many cobs partially filled with kernels but I never put the two together. Fortunately for me my father did not either. But if I had known the functions of that silk, I would have seen in it a beauty that I never saw. The peculiar economy that it performs would have been of great interest to a boy of

my bent — far beyond the spectacular interest that I felt. And so in all plant life. We bewail the going of our boys to the cities, but that does not stop them. One of the remedies, in my judgment, lies in making farm life interesting. They must have somehow this development of the inner thinking life, and if they do not get it upon the farm they will go elsewhere. We have left our boys and girls lives upon the farm barren, because we have not put into them the interest that is really there. We do not associate our children with us in the management of the farm, we do not take them into our counsels, and we forget that the interest that we take in carrying out our plans, is entirely absent from them.

It is the function of our schools to put a vital interest into the lives of our children.

*The University and the Farm.*

This leads me to the subject upon which I am to speak, the relationship of the university to the farm. We must find a remedy for this state of things Wherein shall we find that remedy? Frst, we must find the knowledge of these things to impart to the young to vitalize their lives and put interest into their work. That knowledge must be produced, and it is the function of the University to produce it.

Secondly: It must put that knowledge into a form that is adapted to the young. Scientific knowledge must be simplified, and formulated and this must be done by the higher institutions of learning.

Then comes the third requisite, and therein lies the great difficulty. We must develop and equip teachers that can go into our country schools and carry this lesson, this vitality, this interest. It may even be in the books but the personality of the teacher is necessary to give it shape and force. Now, to put that teaching force into the minds of six or eight thousand teachers, is an enormous work.

Beyond that, the community must be developed to an appreciation of this work which will lead it to encourage and demand it. Necessarily the preparation will be more expensive. The improved talent will command higher prices in the market, and it must be paid for at its worth.

*The Country School and the Universtay.*

Now, the University has been endeavoring during the past few years to develop a system of courses of study which should connect the country school with the highest reaches of the University, and this last year, there has been announced an intermediate course which is to make the final connection. This course admits to its classes those who have completed the full curiculum of the county school as laid down by the state superintendent so that a graduate from a country school may be admitted without examination to this middle course, then two years after, he may be admitted to a college course in agriculture of indefinite length.

But the University has other relationships to the farmer than those which I have indicated. It has too long been the impression that a college is a place where a few young men—and lately, young women — may gather and go through a prescribed curiculum. The better idea is gaining ground that a university is an institution that will promote education among all the people. In three different ways is that idea carried out. First in the admission of adults to the classes of the University.

During the past year there have been some sixty in attendance at the University who are 21 years old and upwards, several who are past 40. Such adult students can study in the special lines in which they desire to inform themselves. But the most important benefit to the farmer lies in the line that has been so well represented from this platform to-night by Prof. Henry, the discovery and formulation of agricultural knowledge through study and experiment, and the giving it out to the community, thereby making it possible for those who can never go to the University to receive the benefits of the work done in that institution.

Again, through these institutes the University is endeavoring to do a class of educational work with which you are familiar. It is our hope to extend these educational endeavors, to put more work into the discovery and formulation of knowledge, and to more and more freely communicate that knowledge to the people, so as to make the University more and more an institution of the people, devoted to helping them in all practicable ways, and to lifting them up into those higher spheres of mental activity which are most wholesome and profitable, practically, intellectually, morally; which are advantageous financially; and serviceable to our whole civilation.

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PROF. PARKER—Our present secretary of agriculture, Hon. J. M. Rusk, who we remember as a farmer, a soldier and governor of our state for seven years, who is always a success and never forgets his vast army of friends in Wisconsin has kindly sent Col. F. E. Parsons, as a representative of the department of agriculture.

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# DEPARTMENT OF AGRICULTURE.

## BY COL. F. E. PARSONS.

I come here as a representative of the Department of Agriculture, and I came because I was wanted, I suppose, at both ends of the line. I heard what Gov. Hoard said this morning. He said he had been abroad in different parts of the country and Canada, and he returned home with a feeling of shame when he learned what attempts had been made to weaken this great work of the farmers' institute. My friends, if you will do as Gov. Hoard has done, and as I have done, go out and realize the position of this great state, you will have more pride for Wisconsin, than you ever had before. It is not long since the time when we could not have gotten together such an audience as this to listen to agricultural subjects, but the farmers are wide awake, they are trying to learn the very best methods, and everywhere I have been, from Nebraska to New York, from Mason and Dixon's line to the lakes, whenever they found out I was a citizen of Wisconsin they have praised the methods, and the doings and the laws of Wisconsin, until I felt proud indeed. I did not

blush, because I knew all their praise was true. Wisconsin has the lead and when other states plan their farmers' institutes they send their representatives to this state to your superintendent to get their lessons from him. In all the states where they have not farmers' institutes they are passing resolutions in every farmers meeting to call upon the legislature to establish institutes. In Iowa some of the best men have passed resolutions to go down to their next legislature, and demand that farmers' institutes should be established, and they all say, "When we get them we want them just like Wisconsin."

***Farmers' Institutes.***

If anything has ever happened in the state of Wisconsin that has given it a name far and wide it is these farmers' institutes. I have been around and I have heard the verdict, and I say if the farmers of Wisconsin permit this instution of learning which belongs to them to be weakened by any party or any politicians you ought to be ashamed of yourselves, and you never ought to have a good thing in the future. There ought to be no politics about it and there never has been, either, in its workings.

***Dairy and Food Commissioner.***

Then again, I have been told in these other states, "One of the best things you have ever done in Wisconsin was establishing that office of Dairy and Food Commissioner. That was the cleanest cut thing you ever did there." Do you know, my friends, your cheese is disgraced in Europe by the stuff that is being sent out from this state, just the fellows that your food commissioner is after, and if you farmers of Wisconsin let that office be abolished for the sake of $3,000 or $4,000 you will have to put your good cheese and butter up against old stuff that is not fit for food. We have a right to be protected. There is no one who can give protection to us who consume your food, but you producers.

***You Feed the Nation.***

The voice of the farmer has become potent in the land; you must unite for the purpose of protecting your own interests and not suffer other people to walk over you. Let me tell you something, the farmers of the country number, I suppose, in actual workers about eight million people. Well, that is a good many. You should get your minds made up as to what is right, and you should ask for it gently but firmly. You have to figure out with intelligence one of the greatest undertakings on earth, and that is to feed sixty-five millions of people with good wholesome food. That is the job you have on your hands, and the nearer you can come to doing this, the more independent you are. Look in every direction, and see what will be for your interests in making a market and then see to it that what you have is fit to eat.

The splendid show of potatoes over here shows that the farmers in this part of the country have put intelligence into their work, and learned what they can raise to advantage.

I have heard many things in this room to-day that would be of great value to me if I were farming. We get a great deal of instruction, my friends, in one way and another, but the trouble is we don't apply it. The questions and subjects that come up here are of much consequence to you. I know you come here to hear, and I believe that you are going to learn, and I believe we shall all go home with the determination to do all in our power to promote

the welfare of the farmers' institute, and the name of this state will still stand proudly in the foremost rank, and your children will rejoice that they carry the banner, leading all other states in agricultural knowledge, and in agricultural advancement.

# WAUPACA.

## By Mrs. Lizzie Stetson.

***The Potato is King.***

*Mr. President, Ladies and Gentlemen:* It was with reluctance I consented to take part in the exercises this evening. I consider it a great compliment to be invited to address so intelligent an audience as I find assembled here this evening. Although I may not do my subject justice, will try to paint Waupaca in its true colors. Beautiful are the footsteps of those who bring glad tidings, for hath not potatoes been crowned king? and is not Waupaca the capital? and do not the princes of commerce come from all ends of the earth, to do him reverence and pour down at his feet the silver drawn from the inner recesses of the western mountains? Hath he not made his subjects happy, and made hayseeds' pockets resemble the "horn of plenty"? "He hath clothed his sons in broadcloth and his daughters in fine linen."

This evening we hold high carnival in the tribe of Agriculture. To the many wise sachems, who honor us with their presence, we give kindly greeting. We have heard of your fame, of your great wisdom. Waupaca asks you to command, and we are proud to do your bidding. The little Gem City of Wisconsin, nestling in this beautiful valley, surrounded by its coronet of hills, would do you honor. Your advice, thoughts and words will fall on mellow ground—seed sown will spring up and bear rich reward.

Perhaps it would not be amiss to make you gentlemen, who have and will address us during the series of meetings, better acquainted with your surroundings. It is scarce two score years since the barrier was thrown down by our government, and civilization seized upon the belt of country known as the Indian land, lying west of the Fox and Wolf rivers. It was in the fall of 1852 that old King Oshkosh led away from this country what was left of the once powerful band of Menomonees — the very tribe who, under the command of Monsigneur De Langlade, met and defeated Gen. Braddock and Washington at Fort Du Quesne.

***The Pioneers.***

Westward the star of empire takes its way. It is the men who meet here this evening, that have swept back the wilderness, and built beautiful homes, extensive farms, and added another county to those which already formed proud Wisconsin. You have developed its resources and demonstrated that the light soils of central Wisconsin can be worked at a profit — that even here the queen of horticulture looks with favor. It was with emotions of pride that an old citi-

zen of Waupaca stood beside the fruit collected from all parts of the state, spread out for exhibition in the horticultural rooms at the capital, and heard the answer to the inquiry: "Where did those beautiful apples come from?" They formed the center plate, the nicest ornament of the display. The attendant replied: "Waupaca." Yes, Waupaca can and does raise the finest fruit of any county in the state. Millions of timber swept by the woodsman's axe from its bosom, have been the source of wealth for the many Crœsuses of the state, and have furnished the material for many a city.

Waupaca, noted for its beautiful scenery, is as well noted for its high rank in all business enterprises. In regard to educational interests we are second to none. A short time ago a prominent citizen, being asked why he didn't send his son to school, said: "Well, my opinion is, the fellow without the education is the one that 'gets there.'" Of course there are exceptions to all rules. Waupaca is willing to come under the exception, for we have a well graded school, under the supervision and control of an able instructor and disciplinarian.

I must not forget to mention the nursery, located south of the city. Although yet in its infancy, it is quite an advancement in the way of horticulture. The proprietor, though not well posted on the names of house plants—having been heard to call a beefsteak begonia a "beefsteak bologna"—however, is well versed in the culture and names of trees, small fruits, etc.

### *Old Indian Mounds.*

If time would permit, I might indulge in some thoughts of the race of people who once held possession of our valley, and whose boats must have skimmed over our many clear and crystal lakes. On yon range of hills are many of their quaint-shaped mounds. Although I am not able to solve their history, of one thing I am certain: Those hills with rugged front, dotted with majestic boulders, have been there a very long time; and some antiquarians have been heard to say, that it was on Mount Tom that Noah's Ark rested after the flood. Wise men have held weighty and protracted discussions on this subject, but it still remains unsettled. No wonder we are proud of our history, proud of what has been accomplished in so short a time. It was but as yesterday, our young men rallied to the call of Abraham Lincoln, and the tramp of armed companies going to the front was heard along our streets. Are not their brilliant acts, their heroic achievements, written in history? On most every field of battle in the wide area of strife, were found the sons of Waupaca; their bones lay bleaching on many a battle field.

Waupaca again comes to the front in the triumphs of peace. Just over that range of hills may be found a memorial of a grateful people to the defenders of their country. There is home and a place to rest for those to whom fortune has been unkind. There they will be provided for until they have fought their last battle. That such an institution exists, was due to the generosity and patriotism of the prominent citizens of Waupaca. It was in this county originated the plan for better care of the insane—the honor of which was fraudulently claimed by the board of charities and reform. The plan was successfully carried out, without state aid, and insane were being cared for from other counties, long before the measure was passed giving state aid to counties.

I have read that the question of doing away with farmers' institutes is being agitated by our legislature. I think I can illustrate our position with a little story. In earlier days, when rapid speed upon railways was being discussed, a member of the British parliament asked Stephensen, the famous engineer: "What if a cow should get on the track?" Stephenson replied after thinking awhile: "That would be bad for the cow." If there are any politicians who try to stop the car of progress, in which the farmers are pushing to the front, I must say I think it will be bad for the mules.

Thanking the managers of the institute for the honor they have done me, by giving me a place on their program—probably for the reason my father was once a farmer, whose boast was that he had cleared more land and improved more acres than any man in the county. But I shrewdly suspect, he did it as some patriots served their country—by a substitute.

I have worried your patience too long. If I have not done justice to my theme, I would advise you to do as a legislator did the other day—my informant was down to Madison on a free pass—you can move to amend the title to suit the bill.

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Music—Male quartette.

The institute then adjourned to 9:30 A. M. next day.



# MORNING SESSION—MARCH 19th.

The Institute met at 9:30 P. M. Geo. McKerrow in the chair.

## INSECTS AND DISEASES OF THE POTATO.

BY PROF. E. S. GOFF.

*Mr. Chairman, Ladies and Gentlemen:* It has been the history of nearly all cultivated plants that for a considerable time after their introduction to culture, they have been comparatively free from destructive parasites. But as the area devoted to their culture becomes greatly extended, and vast numbers of the plants are crowded together in close proximity, insects and diseases appear among them, which often prove very destructive, and sometimes threaten to exterminate their culture.

The history of the cultivated potato offers an excellent illustration of this truth. About the year 1845, the potato disease for the first time assumed a very alarming character in Europe, and in this country, and for one or two seasons the crop was almost annihilated, in consequence of which a literal famine occurred in Ireland. Up to about 1864, the potato plant was almost free from injurious insects. At that time the culture of potatoes was extended to the mountains of Colorado, and the native

*Colorado Beetle*

becoming introduced into our potato fields, swept like a prairie fire across the continent, and but for the fact that we have learned how to successfully combat it, would long ago have exterminated the potato from culture in this country.

The Colorado beetle is an insect that is familiar to us all. The insect passes the winter in its perfect state, the last brood of beetles entering the ground after the potato tops die. With the first warm days of spring, the beetles emerge from the ground and the female lays her eggs upon the leaves of the young potatoes. In about a month after the eggs are laid the first brood of larvæ are matured and enter the ground again, then in ten or twelve days another brood appears and this in turn in about a month attains the perfect form and again enters the ground to appear in due time as a third brood. Thus there are three broods of the potato beetle in the northern United States.

It is probable that you are all familiar with the methods of dealing with this insect. You all know that certain compounds of arsenic, as Paris green and London purple are specifics for it, and you are all probably familiar with the machines that are being used for distributing these poisons. It is not, however necessary to provide ourselves with expensive machinery to handle the potabeetle, as the object may be accomplished in a satisfactory manner in the average

potato field, with an apparatus that costs but a dollar or two, and which is described below.

*How to Apply Poisons.*

We can apply the poisons dry, diluted with some cheap powder, as common land plaster or air-slacked lime, or we can apply them with water. I have found the dry method more satisfactory. Of course water costs less than lime or plaster, but the trouble of using it is greater. While connected with the experiment station in New York, I made a careful series of tests to find out the smallest amount of Paris green or London purple that would answer. I tried 1 pound of Paris green to 100 pounds of plaster, and found that was quite efficient. I next tried 1 part to 150 and I found where the mixture was perfect this was also efficient. I next tried 1 pound to 200, but found that with so great a dilution some of the beetles would escape, and I settled on the conclusion that 1 part to 150 is about as small an amount of poison as it is wise to use. An old barrel churn is a good thing in which to mix the materials.

For applying the powder I find nothing so good as a hand sifter, a sort of pail made of galvanized iron or tin with a perforated bottom, a rigid handle and a tight fitting cover. We simply have to give the pail a shake over the plant to cover the foliage with the mixture. A man can use two of these pails at once, if he chooses, and thus take two rows. Of course this applies only to those who have not a large area of potatoes. Where a man raises ten or twenty acres, he would require some horse machinery for distributing poisons. When applied in water, I have found that one ounce of the poison to ten gallons is a good proportion.

A few other insects are injurious to the potato at times, but hardly enough so to merit discussion here. The flea beetle has been reported as doing damage in different parts of the country. It is similar to the cabbage flea beetle, and like the latter, does not appear to be susceptible to arsenites. It does not eat the foliage much, but subsists upon the juices of the plant. Strong tobacco water is perhaps the best preventive, but does not form a complete remedy. The white grub sometimes injures potatoes to some extent, and the cut worm is also troublesome at times. For these insects I can at present suggest no practicable preventive.

*The Potato Rot.*

The most common disease of potatoes is what is known as the potato rot. This disease always appears first upon the foliage of the plant. Its life history has been the subject of much study and some dispute. Doctors, however, agree that it lives from one year to another from what are called resting spores. Two kinds of spores are produced, one maintains the life of the fungus during the summer, the other during the winter. These resting spores are formed in leaves that have been destroyed by the fungus, and also in the decayed tubers. In wet weather and on wet soils these spores are in a condition to germinate. Some are deposited by the wind or other means on the foliage of the plants, and being in contact with a moist surface, these very minute spores germinate and send a little mycelium through the epidermis of the leaf into the interior. The disease, when once it has obtained a foot-hold, spreads under favorable conditions with great rapidity, and one day is sometimes sufficient to blast a whole potato field as if fire had passed through

t. The spores being formed on the leaves are set free and fall to the ground and the rains wash them down into the soil, where they come in contact with the tuber, and thus it is that the potato rot begins. Unfortunately, no positive remedy has been discovered for this disease.

*How to Prevent Potato Rot.*

Perhaps our best preventive measure is to plant early; this brings early maturity. The disease always prevails worse in the latter part of the season. We can do something by thoroughly draining our soils, as the fungus is always worse in wet soils and seasons. In order to lessen the chances of the disease the following year we should burn the tops of the diseased tubers.

Prof. Weed, of the Ohio experiment station, made a test during the summer of 1889, which promises to be of some value. He sprayed the tops of potatoes with a mixture of sulphate of copper and lime, what we call the Bordeaux mixture, and found that the rot was considerably less on the area sprayed than on that not sprayed.

*Another Disease of the Potato.*

There is another disease of the potato which appears in July or August as a black blight on the foliage, causing the tops to die as if a fire had passed through the field. It was very prevalent the past season in the southern part of Wisconsin and in Illinois and Ohio. This disease has not even been named. It is being investigated, and we shall probably soon know more about it. Experiments have shown that the Bordeaux mixture is a preventive of this blight.

*How to Make the Bordeaux Mixture.*

I will now tell you how this Bordeaux mixture is made. I dissolve six pounds of sulphate of copper (blue vitriol) in four gallons of hot water, and in another vessel slack four pounds of fresh lime in four gallons of cold or warm water; then when the two solutions have dissolved, add them together and dilute with water until the whole makes 22 gallons, when it is ready for use. We apply it with a force pump or any other apparatus for applying liquid mixtures.

*The Potato Scab.*

The potato scab is a disease with which we are all familiar. There appear to be several different causes for this trouble. It seems that almost anything that corrodes the surface of the tuber in the soil will cause the potato scab. It appears that the planting of scabby seed tends to increase the disease.

Some years we find that after harvesting our potatoes and storing them in the cellar they are destroyed by rotting. There are several different fungi that may cause the rotting of the potato in the cellar. I know of no positive remedy for this trouble. While connected with the New York station we found by careful test that slacked lime did not prevent the trouble.

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*DISCUSSION.*

MR. FISHER—If you can bend the tops over and hill them up pretty well, is not that a partial preventive of potato rot?

PROF. GOFF — That has been tried pretty thoroughly in England and found to be beneficial, but it is not generally practiced, whether because it is too expensive, or for some other reason, I do not know.

QUESTION — Can you tell from the looks of the plant whether the tubers are going to be affected with rot?

PROF. GOFF—We can. The fungus

appears first as blackish spots on both sides of the leaf, and on the under side we find a silky or wooly appearance surrounding the spot. The spot increases around the borders.

QUESTION—When would you apply the Bordeaux mixture?

PROF. GOFF—I should begin to apply it as early as the middle of June for early planted potatoes.

PROF. HENRY — Do you put in the whole of the lime, or do you just let the lime settle and take the lime water?

PROF. GOFF—We let the lime settle and pour off the water, and afterwards we can add more water if we choose. We use enough lime so that the water is colored like milk.

MR. FROST—Do you find it advisable to use hot water in preparing Paris green water?

PROF. GOFF—I have never used it, and know of no advantage in it. Paris green is insoluble, and we do not wish to render it soluble even if we could, because this would endanger the foliage.

MR. HARTMAN—What is the result of too much Paris green?

PROF. GOFF—It will blight the foliage. It will not injure the tubers except through the foliage.

MR. ROBINSON—Is there any advantage in plaster as a fertilizer for potatoes?

PROF. GOFF—On some soils plaster is found quite beneficial. On others it has no effect.

MR. BRAGG—Is there any advantage in mixing plaster and Paris green some time before using them?

PROF. GOFF—No, sir.

QUESTION—Would ashes be a sustitute for plaster?

PROF. GOFF—Any light cheap powder will answer. It doesn't make much difference what it is if it only dilutes the Paris green.

QUESTION—On what does the flavor of potatoes depend? Is it upon the starch content, or is the flavor affected by the soil?

PROF. GOFF—Mr. F. A. Heubner, a very intelligent potato specialist of Manitowoc, tells me that the flavor of potatoes is not necessarily dependent upon their starch content, and that tubers grown from seed are always inferior in flavor for the first generation or two, though their content of starch is as high the first year from seed as it ever is. I believe it is perfectly well established that the quality of potatoes of the same variety grown on different soils is often very different, and until recently, I had ascribed this difference to a variation in the water supply of the soil, which produced a corresponding variation in the starch content. But I have since met samples of potatoes that cooked dry and mealy, which no potato poor in starch can do, and yet the flavor was very inferior. I may add that Prof. Voorhees, of the New Jersey experiment station has been investigating the influence of different manures upon the quality of potoes. He found that those raised with sulphate of potash were finest in flavor, those from farm manure next, those from muriate of potash next, and those grown with kainit were poorest.

QUESTION—How can we prevent potatoes kept for summer use from sprouting?

PROF. GOFF — A French method has recently been highly recommended, though I do not know that it has been tried in this country. It consists in soaking the tubers for ten hours in a very dilute sulphuric acid, formed by adding two parts of commercial sulphuric acid to 100 parts of water. The

acid is said to penetrate the eyes sufficiently to destroy their vitality, while it has no effect upon the skin of the potato. The tubers must be throughly dried before storing. The same liquid may be used any number of times with equally good results, and a barrel or tank of any kind will do for the treatment. This method is worth trying, but I would advise a test on a small scale first.

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# ONE YEAR'S EXPERIENCE IN GROWING POTATOES.

BY E. D. FROST, Almond, Wis.

### *Our Way.*

Last season I planted thirteen acres of potatoes on the home farm, on ground that had been pastured the year before. I had spread over this piece a light dressing of barn-yard litter. It was plowed about seven inches deep, dragged once, marked both ways, and planted with spades. The spade is handled with one hand, pressed deeply into the ground, tipped forward, seed dropped down behind the spade, which is then withdrawn and the earth falls on the potato. In this way the seed can be put in deep, and we have fewer missing hills than by most methods. I dragged once before sprouts showed above ground, and partly dragged a second time, but stopped because I thought I was doing more injury than good. I gave this piece nearly level cultivation, but the ground must be kept very mellow or the tubers will push above the ground and get sun-burned. They got injured in this way. Hilling with the cultivator would have been a great benefit this season. The more cultivation the better, and most fields suffer for lack of it, but injury may be done with the cultivator late in the season if the hills are disturbed.

Bugs were killed with Paris green, put on with water. Two applications were required. Hand sprinklers were used, with spraying nozzle and plunger.

For some reason, perhaps excessive hot and wet weather, potatoes planted the first week in June showed many missing hills, and later in the season, blight injured the fields more or less. Parts of this field suffered by rotting of the seed, and also from blight. We dig with six-tined forks and haul direct to the cellars. The yield was 2,000 bushels from the thirteen acres.

### *Expenses.*

Figuring expenses for plowing, planting and caring for the crop, I find the crop cost $150 in the cellar. The 2,000 bushels then cost less than 10 cents per bushel, or $11.50 per acre. The cost put into market was about fifteen (15) cents per bushel.

I planted another field. It was late in the season and I plowed the potatoes in, dropping in every third furrow. The land was light and did not yield so well

but there was very little trouble from bugs. The potatoes were very smooth and fine. It cost 7 cents per bushel to raise these potatoes and 10 cents to dig and put into market. Yield, sixty bushels per acre. I did not figure in the rent of the ground in either case.

*DISCUSSION.*

MR. ROBINSON—What time in the year did you plow that land?

MR. FROST—The home crop I planted the first week in June, plowing just before planting. The second field, from the 13th to 17th of June.

QUESTION — What was your loss on those 2,000 bushels when you came to take them out to market?

MR. FROST—It was 10 per cent. from black rot this season. If potatoes are well ripened the shrinkage will be very little.

MR. ARNOLD—Won't they shrink more kept above ground than in the cellar?

MR. FROST—The potato warehouses that are being built have no cellars, as a rule, and the heaviest buyer and shipper I know of said to me this winter that he would rather pay three or four cents more storage to have the potatoes kept above ground. But I think the trouble with him was a lack of ventilation in his cellar.

QUESTION—How deep did you plow in those potatoes when you planted them?

MR. FROST—About five inches, though I would have preferred more shallow plowing on account of digging.

QUESTION — How did you cut your seed?

MR. FROST—Down to about two eyes to the piece. Sometimes we split a potato, and sometimes cut it in four pieces. I like to cut it immediately before planting.

QUESTION—Do you advocate early or late planting to get a good crop?

MR. FROST—This depends upon the season. I shall plant some early and part late this spring.

## POTATO RAISING.

BY GEO. W. MARTIN, Hudson, Wis.

Potato culture, like all branches of agriculture, has to be learned. I have been growing potatoes for several years, from ten to eighty acres per year, and it is what I do not know about growing them that troubles me.

Necessary to the production of a good yield of potatoes is good soil, good seed, good cultivation, and having them well protected from bugs.

Nearly all soil in this state can be made to produce a good paying crop of good potatoes.

Our much exhausted soil must be regenerated before a good crop can be grown. I have tried different methods and find barnyard manure the quickest, best and surest way of preparing land for a potato crop.

Clover sod is good, clover sod and barnyard manure are better. "Timothy sod is not good." Do not plant the

same piece of land twice, my experience having been more trouble with bugs and more liable to scab.

I prefer to plant in drills thirty inches apart, five to six inches deep, and ten to twelve inches apart in the drill.

Seed to be cut to one or two eyes, and not too small. Potatoes for seed should not be allowed to heat or sprout. Move them or turn them, which will prevent sprouting.

Temperature for all vegetables should be thirty-two to thirty-five degrees. Keep a thermometer in your root house. Cut seed one or two days only before planting, as much seed fails by being cut and then piled or sacked.

I plant with a planter, which makes its own drill and does its own marking. Plant or make rows perectly straight on acco unt of ease in cultivation and sprinkling or bug killing. To me it is a pleasure to see a neat, clean, straight planted field of potatoes or any other crop. I use three 1,200 pound horses and a good man. The machine does perfect work.

Roll the ground immediately after planting, to pack or firm the dirt, that the soil may be kept moist. Never open drills ahead of planting. Kill all weeds by repeated harrowing until the plant is visible, then cultivate, turning the soil to the plant. Harrow and cross harrow. Keep weeds down by repeated cultivation until the plants begin to blossom.

Cultivate, level and hand pull all weeds left, which costs me about $1.25 per acre. Potato and all hoed crops should be clean and free from weeds, as it pays at harvest time and for future crops that are to be grown on the land.

Bugs must be kept off, as the full foliage is necessary to the plant.

Two pounds of Paris green to six barrels of water applied to plants when dry, will destroy bugs; one to three applications as the case may require. It is much easier to destroy them when first hatched. I use a six barrel tank, the teamster sprinkling two rows at a time and a boy to stir to keep the Paris green from settling.

Most of the bug killing can be avoided by heavy fertilizing and late planting, and much labor can be saved in destroying weeds by late planting.

Do not plant until the ground is warm, that the plant may come up vigorous and strong. It is the small and slow growth plant that is destroyed by bugs.

Some years since I asked Mr. J. M. Smith what he used to kill the cabbage worm. He replied, "Nothing," and said: "I force my cabbage so that the worms cannot harm them." This led me to try the same method on my potatoes. Last season I did not use ten pounds of Paris green on 50 acres. The year before not any on the same amount of land. On land adjoining they used 100 pounds on 15 acres.

I plant for winter use from June 10th to 20th. My best crop last year was planted the 20th of June, on clover land, well manured. I harvested on this piece 225 bushels per acre, early varieties being used of course in all late planting.

Dig when ripe, and not until ripe. Potatoes are not ripe or fit for market when the skin will rough in handling. Green potatoes are not profitable to the grower, the buyer, nor the consumer. Our prices are badly demoralized every season by the green stuff sent to market.

As a rule sell from the field when dug. Avoid the commission man as you would a pestilence.

I dig with a machine, drawn by six good sized horses, which leaves the potatoes clean in the row and the land in perfect condition for the next crop. Assort from the ground, picking nothing but good size table potatoes. There cannot be too much said about the assortment of potatoes for market. On most farms anything bearing the name of potato must be sold. This is a great mistake. The second picking "about one-fifth with me," will make, when assorted, good feed and seed.

The above first assortment will bring more money in any market than the whole crop. In short, offer for sale such as you yourself would buy.

Farmers near any one market should plant one variety. Select some kind that is well quoted on the market and that is well adapted to your particular locality; by so doing you can get a much better price. Keep plenty of help; there is no economy in trying to see how little help you can get along with—put your brains to work and see how much help you can work to a profit. Keep stock enough to work up your coarse feed so that you will have enough barnyard manure to go over your farm once in four or five years—thereby your farm will grow a good crop of potatoes or any other crop.

Agriculture, like all other branches of business, has by necessity become a science.

The time for hap-hazard, go-as-you-please farming has passed. Close, careful attention, with much study and good figuring, are necessary to success.

No more guess work, no more wheat growing because you have been growing wheat for thirty years, nor because the signs are that the season will be cold and wet, not favorable for chinch bugs, which, by the way, I consider a blessing instead of a curse to the general farmer, thereby forcing him to abandon unprofitable crops. Diversified farming must be taken up at once, now, this coming season.

Do not wait till we are driven from our farms and homes. Form new plans for 1891. Tell your family, tell your neighbor, that you are going to produce a little of everything. Keep a few cows, hogs, sheep, chickens and turkeys. Raise a few choice colts, grow a few acres of onions, cabbages, beans and potatoes, which I from experience can assure you will materially change the general appearance of your farm and your bank account.

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### *DISCUSSION.*

QUESTION—How did you apply that manure?

MR. MARTIN—I have been plowing it under. I have used both well rotted and green manure.

QUESTION—Did you get the best results from manure applied some time previous to plowing, or immediately before plowing and planting?

MR. MARTIN—I have got my best results from rotted manure applied some months before planting.

MR. COLE—Tell us something about potatoes rotting in store.

MR. MARTIN—Last year I had considerable trouble with my potatoes rotting. I had a foreman working for me that knew more about potato culture than I did, and when we dug our potatoes it was pretty late, and he thought it was

all nonsense in pitting those potatoes. I allowed him to put them into the cellar as we took them from the field. In February I had to sort them. They were rotted a good deal. This year the price didn't suit me exactly. I took the time and sorted them and pitted the good potatoes by themselves and the others by themselves. Of course the potatoes were thoroughly cured. I put into the cellar nothing but very dry, smooth stock. About the middle of February I went in and turned about half of them, and they were still dry and dusty as they were when they went in. I sprinkled a very little lime on them as I put them in.

QUESTION—When potatoes are worth a dollar a bushel would you plant scab by or small potatoes for seed, if you could get them for nothing?

MR. MARTIN—I would not plant a scab by potato. I would plant a reasonably small potato for seed when they are high or any other time. I would cut it.

QUESTION—Is it better to plow your ground in the fall or in the spring?

MR. MARTIN—If I should plow my manure in I would plow it in the spring, just before planting.

MR. PARKS—What variety do you consider the best?

MR. MARTIN—I am running on Early Rose and Hebron.

QUESTION—Do you recommend level culture on clay soil as well as on sandy soil?

MR. MARTIN—I have had no experience on clay soil. I think if you should cultivate level in a wet season on clay soil you would meet with trouble.

MR. HYATT — Have you any certain knowledge that the little potatoes are just as good as the big to plant?

MR. MARTIN — I have been growing from the same kind of potatoes all my potato life, as you might say. I do not take a small potato, I take a reasonable potato, the size of a hen's egg. I have looked up the experiments at the experiment farms, and they show just as good results from one as the other.

PROF. HENRY—Do you find any difference between seed potatoes where they have sprouted before planting, and those that have given out no sprouts?

MR. MARTIN — I find that a potato which has not sprouted grows a much stronger and thriftier vine than one that has sprouted.

QUESTION — Are potatoes more likely to be scabby which are grown near the top of the ground than those grown deeper?

PROF. GOFF—I don't know why they should be.

MR. BURTON—Can you prevent, and if so, how, the seed from sprouting before the time of planting?

MR. MARTIN—Not entirely. And yet, on second thought, I might say yes. If you keep a thermometer in your root house and keep the temperature as close to 32°, the freezing point, as you can if your potatoes are dry when they go into store they will sprout very little. I will say this. As soon as I see that my seed potatoes are going to sprout in my cellar, I take them to the stone basement in my warehouse, where it is reasonably dark, stir them, and occasionally turn them.

QUESTION — Do we understand Prof. Goff to say that he got at the experimental station as good results from small potatoes as from large ones?

PROF. GOFF—At the New York experimental station, our results were very perceptibly in favor of large seed.

MR. HYATT—I said several years ago

that I would select my seed potatoes as I would my cow. In digging, I would take a basket along, and if I found an unusually prolific hill, and could see no cause for it, I would put them in a basket by themselves, and if potatoes were not more than a dollar a bushel, and I had a choice kind that I didn't want to run out, I would plant those potatoes whole, and I wouldn't expect them to run out, any more than my cows do. Prof. Henry's results and my own were alike.

MR. FISHER—I think it stands to reason that large potatoes will produce a large crop. If you look in a bin of sprouted potatoes, you will see where the big strong sprouts come from, and they don't come from the little bits of potatoes. Five years ago, I did the same as this gentleman speaks of. There were five diggers. I had one boy that was not big enough to dig, and I gave instructions to the diggers, whenever they found a perfect hill, to throw them together, and the boy picked them up. I got 50 bushels that way. I calculate to do it every year, because I think it would pay. The next year I planted those, and I also planted some of those that Mr. Martin claims are just as good. I had three plants of the big ones and two plants of the little ones, and when I came to dig those potatoes, I went down to do the same thing again, and looked for the perfect hills, but it was that year the weather was so exceedingly dry, and then wet afterward, and I couldn't find a perfect hill on any of them.

MR. MCKERROW—I would like to ask Prof. Goff if it is not his opinion that the large selected seed will keep up the vigor of potatoes better than the small ones?

PROF. GOFF—While connected with the New York experiment station, we carried on various experiments, through five years, based on a selection of seed. We selected seed from the most productive hills, also from the least productive hills, and planted them separately. We found that throughout the five years, the yield from the most productive hills was decidedly better than that from the least. We found that the smallest potatoes from the most productive hills yielded better than the largest ones from the least productive hills. I think we can increase the vigor of the plant by selecting from the most productive hills. The question of the size of the potatoes I think depends very much upon circumstances. If our soil is rich and we have a favorable season, I think the small seed planted closely will yield just as well as larger seed planted farther apart.

MR. MARTIN—If I were fixing the awards on potatoes, I would not select a large potato to give the premium to. And I did not, in fixing the premiums this morning. I picked out the potato which I considered would sell best on the Chicago market. It is not the largest potato that brings the most money. It is not the largest potato that gets the biggest yield. If you select large seed, you will grow a large overgrown potato, a large knotty potato, and irregular in shape. I will venture to say that the potatoes that received the premium were grown from medium sized potatoes.

SUPT. MORRISON—Now, I know a great many of your people will go away from here and will say that Mr. Martin has advocated planting small seed. As I understand "small potatoes," they are generally picked out about this way. We put our potatoes into the cellar in

the fall, and the good housewife picks that bin all over during the winter, and when spring comes you have got a whole lot of small potatoes, which you plant every year, and every season your crop is degenerating and running out. As I understand, that is not the kind Mr. Martin means.

MR. MARTIN—I would say about the size of a hen's egg. I sort in the field, and pick up nothing but what I consider good marketable potatoes. I throw out about one-fifth of my whole crop, then I re-sort those left, so that I have an average smooth potato the size of hens' eggs and upwards, for seed.

QUESTION—Are we not justified in raising those large potatoes for starch?

MR. MARTIN—Any good table potato will make good starch.

QUESTION — What do you consider those small potatoes worth for feed?

MR. MARTIN—Twenty cents, if they are cooked, not raw.

QUESTION—What is the relative expense of digging by fork and by machine?

MR. MARTIN—I don't believe I can dig potatoes any cheaper with my digger, and put them into a car or store room, than I can with a fork, charging the expense of my teams.

QUESTION—In storing potatoes must they be entirely dry, and must they be spread out thinly on slatted floors?

GEO. MARTIN—A slatted floor is good and sensible, any way to let the cold air under and around them so they will not sprout so early in the spring, but for temporary storing, for fall or early winter market, they are all nonsense.

QUESTION—When you winter potatoes in a pile outdoors, which do you find the soundest and best in the spring—the dry potatoes on the top of the pile or the bottom ones that lay right on the damp earth all winter?

MR. MARTIN—All who bury potatoes must have noticed that the damp ones are the best.

QUESTION—What is the use of excessive, or in fact, of any drying then, when the soil is in seasonable condition for digging?

MR. MARTIN—I wouldn't handle potatoes at all when they are wet and muddy, but when the soil is in fair condition for digging I would like some brother to prove to me that there is anything gained by drying the potatoes. If they can lie damp and fresh in the soil without injury, why not put them into the cellar or heaps in just the same condition? Spreading out in thin layers also is nonsense, practically. We do not want to dry them, and a circulation of air through them is worse than useless. Of course, it goes without saying that all light should be excluded from cellars or buildings where potatoes are stored. Light will soon ruin the best potatoes. We store them right on the cool cellar bottom or on the basement floor of the barn, three feet deep in August, and four or more feet by the middle of September. We are careful to avoid bruising in handling in hot weather. They will heat up a little sometimes for a few days where large quantities are stored, two or three hundred bushels per day, but they soon cool off and have the temperature of the cellar bottom. We open up at night and let the cool air through where they are stored and shut up early in the morning, thus keeping the temperature quite even. I prefer to make early contracts and draw from field to cars and ship at once, thus avoiding so much handling.

PROF. GOFF—I was recently told by a

merchant who has had many years' experience in handling potatoes, that potatoes dug before they are fully ripe and put up immediately in close barrels will be very short lived. I have observed that the barrels of new crop potatoes, that the merchants receive early in the season, are always provided with ventilation. I agree with the former speaker that it is not necessary, if it is desirable, to have the outside of potatoes thoroughly dry in the cellar, but I think some cautions should be given against storing potatoes in bulk during warm weather, and especially, before they are fully ripe. Of course the need for this seldom occurs.

## AFTERNOON SESSION—MARCH 19th.

The Institute met at 1:30 P. M. Supt. Morrison in the chair.

## STEPS IN THE PROGRESS OF EXTRACTING THE BUTTER-FAT FROM MILK.

By J. A. Smith, Ft. Atkinson, Wis.

*The Past and Present.*

It is related of a lawyer whose beard was yet limber, that in pleading his first case before a circuit judge, that he began way back to the period "when time was young," and that during the first hour he had covered the history of the world from creation's dawn, to the time of the reputed flood; when the bored judge called a halt, and told the lawyer he might skip the next 2,000 years—as there were a few things that a circuit judge might be presumed to know.

I will try to profit by the sarcastic admonition of the judge—assume that you know a good deal about butter making, and not go too far back, or dwell too long, upon the earlier methods employed to extract the fat from the milk of bovines, for the use of man. The things of now, and here, are those that chiefly concern us, to-day.

However butter fat was extracted from the milk of bovines by the ancients, and by all modern peoples, it was not until after our present nineteenth century had passed its "high noon mark," that it was obtained by methods other than raising cream by the gravity processes, and through concussion of it, or churning the whole milk, the fat was extracted from it. From time immemorial, of course, the lighter butter globule has sought to rise through its own levity, and disengage itself from the heavier watery serum. It is this characteristic that makes the extraction of fat from the milk possible by any process whatever. This characteristic has made the foundation for all the claims that have been made for merit, in all the crocks, pans, pails, creamers, and centrifuges that have successively appeared and have heroically fought for success

and pre-eminence, from the first to date. It is that very meagre difference in the specific gravity of the butter globule and the rest of the milk emulsion as it comes from the cow, that makes a theatre for all these systems to get in their claims and work.

*New Methods.*

It is true, too, that the simple discovery of methods as to how a principle acts, does not always work out the latent revolution there really is in it, in the order of its discovery; for some are seemingly so vast, so far-reaching in their scope, that it takes the world some time to comprehend their usefulness so as to utilize them. We see this verified in the fact that the truths involved in centrifuging milk with a rude machine were actually known, and demonstrated, several years—but not many—before the revolution came in extracting butter fat from milk through the ice-cold, deep-setting, and submerged systems. Perhaps these, just named, ought not to be distinguished as separate systems; for, in a sense, they are only "parts of one stupendous whole," and really are only successive steps leading to the Cooley, which embraces them all. It is recorded of Prof. Fox of Germany, that in 1859 he suggested testing the richness of milk by swinging test tubes holding samples of it. In 1864 a Munich brewer, Antonin Prandtl, tried, but not with much success, to get cream from milk by putting it in vessels in an ordinary centrifuge used to abstract the water from syrup, so as to obtain dry sugar. It is even recorded that through the virtue of long swinging of the vessels, he obtained, not only cream, but actual butter. Is it possible that right then and there the extractor was born, and there were no "wise men," either in the east, or elsewhere, to know it as a dairy savior? It seems nobody followed out the suggestions of the revelation, and so the incipient revolution slept.

*Yankee Ingenuity.*

The first of these was only a suggestion; and the second, after a partial trial, was voted into the limbo of "innoccuous desuetude," as a dream. It remained for a live Yankee to do something that led to something, even if he did not do much of the leading that really solved the problem. The Rev. H. F. Bond of Massachusetts, did it with a rude, crude hand machine, that was simply a wooden bar, balanced on a pivot, to the ends of which two glass jars containing milk were bound, when the bar was made to revolve at the astonishing speed of 200 revolutions per minute! Compare that with the speed of the periphery of the centrifuge drum, or bowl, that revolves at the rate of from three to five miles per minute, and makes from 4,000 to 7,000 revolutions per sixty seconds!

But it took out the cream, or rather separated it from the skim milk, in one hour, even at that slow motion; and thus confirmed the faith of those who were intent upon solving the question of the centrifuge skimming of milk. This was in 1870.

*Cold Setting.*

But the revolution, though born, and nurtured more or less through the succeeding six or seven years, did not prevent the coming of another revolution in extracting fat in the form of cream, from milk, through the aid of ice. Though deemed rank dairy heresy, and an absurdity, when compared with all the gravity methods up to that time —about 1874-5—it had a rapid march to the front, and holds its own to this day as the acme of all that has been attained

on the line of the gravity process, for raising cream, through the watery part of the milk, through its own levity. The reason it succeeds so well, is, that the intense coldness of the ice water more quickly condenses the water in the milk than it does the oily part; and thus suddenly widens the difference there is in the specific gravity of oil and water as they exist in the emulsion. Add to this, the coldness keeps the milk liquid longer—especially in warm weather,—and so keeps open longer the passage-way for the smaller globules to travel to the top. Chemical analysis of the skim milk shows the ice-cold process, on the average, is more exhaustive, as a skimmer, than any other gravity process; and for the milk of some peculiar cows, it has taken next to all the fat, leaving no glory to be won, even by the centrifuge, in separating such pecauliar milk. With average milk, however, the power involved in the natural levity of cream is no match for the overwhelming force of the centrifuge that brings to bear upon the milk at the periphery of the rapidly revolving bowl, a power equivalent to the weight of more than a score of tons to the square inch. It makes all the difference between may and shall, about the cream starting from the skim milk; all the difference between doubt and certainty; between conditions that may not be entirely overcome, and "getting there" with both feet.

In saying this, I am drawing no essential distinction in creamers that use the ice-cold deep-setting process, submerged or unsubmerged, but paying my respects to the naked principle, itself, that takes milk warm from the cow, and cools it rapidly. We have had dreams and visions of substitutes for this vital principle, some of which were aids, part of the year, and sometimes when there was no ice to be had, and some of which were problematical, if not snares and delusions—but the vital principle stands, I think, after some of the phantasies are gone; and it only takes second place, when in competition with absolute, forceful, mechanical power, exerted upon a centrifuge.

### *Centrifugal Creamer.*

I return now to a consideration of the steps in the progress of developing the centrifuge creamers of milk, that were being taken while the newer innovator —ice-cold, deep-setting, submerging processes—were revolutionizing the business of raising cream, and greatly improving the general character and quality of the butter of the world. What became of Dr. Bond's invention, more than to lead others on, I have no data that tells. Prior to that D. M. Weston, of Boston, that is, in 1868, had the skeleton of a separator in his brain enough to get a patent on something, and have his name immortalized in the hyphenated name — Danish-Weston — that now is known as one of the standard separators of the world. Something he had was utilized on the other side of the ocean, by those who made it a success, and gave it its compound name. At that time, however, not one of them all had solved the problem of making a centrifuge a continuous skimmer; to evolve that, was what the savants and ingenious engineers in Europe and America were working at, and trying to mature, while the ice-cold method was going ahead to possess the dairy world. Until continuous skimming was made a success, it was one almost futile struggle to get something practial and valuable, by changing the method of construction to use machines that had to be filled at starting, and stopped to be emptied of

the milk and cream separated, fill up anew, and get up speed again. Such machines were used until 1874. They had detachable vessels on revolving arms.

*Another Step.*

In 1874, the idea of a centrifugal drum into which the milk was run and whirled, was conceived, and a rude machine was made by Mr. Winstrup, that was successful enough to inspire a hope; and Prof. Segelcke, of Denmark, encouraged Mr. Winstrup, and others, to go on with what light and facts they had, and see if they could not solve the problem. But not till after the middle of 1876, did a machine that was almost a living entity come from the struggling brain and deft hands of the men chosen to mature and embody the idea. When it was tried it marked a new era in the progress of extracting butter fat from milk. It was far from perfect, and the croakers gloated and fattened themselves on the same east wind they have been breathing and blowing about the butter extractor for the last two years; but it had in it the living germ, and it grew. They had got down to something solid, at last; something that could be run at a great speed, and not be a death-dealing engine, by going to pieces.

Another party of inventors, Messrs. Lefeldt & Lentsch, adopted the centrifugal drum, and modified it; bringing out a machine in 1877. But they still had to fill, start and stop, and fill anew. This party have the honor of establishing, at Keil, the first public butter factory that separated cream from the milk with a centrifuge; and run a regular factory to make separator butter, which they did the same year, 1877. They soon thereafter constructed a device to remove the skim milk and cream, while the machine was in motion, and were justified in shouting "Eureka!"

It was afterwards learned that a continuous centrifugal skimmer was invented in 1875, in Frankfort-on-the-Main, by Prof. A. Prandt; but it was never matured enough to get a foothold in the dairy world, and I suppose was abandoned as a toy, or because it found it was superseded.

*The Cream Separator.*

But no matter about the early struggles of the inventors. The separator was perfected at last, and marched like a conquering army to take possession of the dairy world, to a great extent, and so far as to making the factory butter that is made from gathered milk. It did this because, after great tribulations, it proved it could make more butter to the hundred pounds of milk than any gravity process known to man. It will do so, if the separator, and best creamer, are put side by side, near the cows, and both using divided milk immediately manipulated at the proper temperature for each system; and the separator will do much more, comparatively, with transported milk. I have tried to do my best with getting the fat out of transported milk with the best of iced creamers, and never succeeded in getting more than 3½ pounds of butter from 100 pounds milk, except when I heated the milk to blood heat, before setting, when I did get a little more than 4 pounds. But the heating of somewhat aged milk damaged the product of partially skimmed cheese, made therefrom, because the heating promoted rapid acidification in the cheese vat. As to how the centrifuge affects the yield, as compared with average gravity setting in our best iced creamers, I will give you Dr. S. M. Babcock's facts and conclusions, to fortify those made in

our own factory. I take the data from a communication of the Doctor's, to *Hoard's Dairyman*, printed May 2d, 1890.

*A Milk Test.*

The test was made with what the chemists call "split milk," which is simply well-mixed milk, divided; one part being subjected to one process, and the other to another. Of course, nothing could be more fair. In such trials the skim milk from the separator had in it .31 of one per cent. fat; and the iced creamer .72 of one per cent. The difference is .41 of one per cent., which means, if it was all recovered in the churn — with the customary foreign matter added to it, to make commercial butter of it — a loss of 4.71 pounds of butter in each 1,000 pounds of milk; or, in a factory receiving 10,000 pounds per day, means 47.1 pounds of creamery butter per day otherwise consigned to the pigs and calves. Rather expensive food of which to make from 3 to 5 cent meat! And the worst of it is, this loss attaches to all the milk of the average common cow on the farm, that is not put through a centrifuge, of some kind; and even worse than that comes to those who use the gravity creamers that are not equipped to use ice, or very copious floods of very cold water. I have the authority of the *Iowa Creamery Journal* for the statement that the average gravity creaming that produces the gathered cream of that state, does not extract more than 3 per cent. fat from the milk, during the usual creamery season when three-fourths of the milk is made; and that winter milk, there, does not yield by the gravity process more than 4 per cent; when it is quite probable there is a little more than 4 per cent. in it—yearly average—that the centrifuge would get out.

*A Loss of 25 Per Cent.*

Can dairymen, worthy the grand avocation, afford to feed and milk cows and only get about three-fourths of the most valuable element in their milk? Not unless they have the Almighty to fiat gold for them! Now if these statements are true, and the conclusion warranted, it would follow that there is scarcely a creameryman in the country, in a location where a good creamery can live at all, on, say, 20 to 25 sections of land, who could not afford to gather the milk, and return the skim milk to the farmers, and take as his compensation, the excess of butter he can make with a separator, over what any gravity process can get out of either the farm churn, or the churn of the gathered cream factory. I believe he could do it with any good separator. I have not a doubt he could do it with an extractor, that saves the losses of fat in churning.

Some of the readers of *Hoard's Dairyman* may remember that last May, I had quite a spirited discussion with Messrs. Wm. Beard & Son, of Iowa, upon the merits of the centrifuge versus the gathered cream system, in which they stoutly defended what they were doing in the latter line. I tried to be a "Father in Israel" to them, and to their patrons, in showing them the errors of their system; but confess I had no hopes of their changing their immense business, quite so soon. It is not likely that I converted them, but the cold facts did; and it was announced about the 1st of March, that this large and able firm had put centrifuges into ten or twelve of their factories, for the work of 1891. I do not mention this to gloat over their action, because they act as I then wrote; far from that. But to show again, that the truths of the arithmetic are mighty

in the dairy business, and must prevail; and that instead of gloating, there is joy in my household over any poor sinner who repenteth and puts his feet in the paths of righteousness, and dairy good sense.

*The Goal Ahead, Eureka!*

But solid as the business has become, when conducted in accordance with the principles involved in the use of the thousands of cream separators, there was a goal ahead to reach; another height to scale; another step to take "in the progress of extracting butter fat from milk," as the title of my paper sets forth. That step involves the introduction of the butter extractor, that goes a step further than the separator in denuding the fat in milk of substantially all the other elements that form an emulsion with it. However mighty was the revolution achieved by the separator, in instantaneously and continuously transforming 75 or 80 per cent. of the volume of the whole milk, into almost completely skimmed milk, the machine did not so far complete the work but that it had to have the cream-vat and the churn, to aid it, or rather finish the work of extracting the fat from the resulting 20 or 25 per cent. of the milk in the form of cream. The use of these dairy implements — the churn and the cream vat—prolong the time of getting the butter package from the milk—involve the perils of cream-holding, if it is not churned sweet, and the churning of either sweet or sour cream, for all of which nobody pays a cent. It involves the cost of, and the care of, the cream vat, and its equipment of steam and cold water pipes to warm and cool the cream; involves the cost of, and care of, a churn, the filling and emptying of it, for which nobody pays; the special machinery to turn it, the room it takes on the factory floor, that is occupied by one or more, of each of these dairy implements; thus necessitating the building of larger, more expensive buildings to manipulate them, the same pounds of milk that can be run through the extractor, which machine makes directly and continuously, only two products—to-wit: Butter ready to be washed and worked, and sweet skim milk containing 95 per cent of the volume of the whole milk, ready to be fed to animals, or mixed with whole milk for cheese making, as may be determined by the operator or patrons.

*The Final Test.*

The crucial test for the use of the ice-cold, deep-setting, or submerged system, was whether they decreased the cost of production; whether they increased the quantity, and improved the quality of the butter made over that of the old methods. The trial was made, and the creamers won. The crucial test for the separator was whether it cheapened production, whether it could make more butter from the same milk than either the farm or factory churn, and make that of equal or better quality. The trial was made, and the arithmetic and the chemist said "yes," on the points of cheapness of production and quantity; and private opinions differed, and yet differ, on the point of quality; but the world's "market judgment," and price, said, and yet say, it won on quality, too.

Both these systems have the weak point that they have to commit the cream to the tender mercies of the churn; and it is conclusively proved, already, that concussion to abstract the butter fat is not physically equal to the task of making churning so exhaustive but that it leaves in as much, and

usually more, fat in the buttermilk, than there is in an equal volume of skim milk that comes from gravity creaming, and from separator cream. How to save that loss, as well as the losses involved in cost and use of the cream vat and churn, is the feat the butter extractor addresses itself to; and, as far as heard from its limited use, it wins easily on that line, as the separator won on the creaming line, when compared with gravity processes.

*No Loss.*

We have then, at last, all the butter fat there is in milk, without waste of any through the weakness involved in all concussion churning. The butter comes from one spout of the extractor, and from the other comes all the sweet skim milk there is in it; thus putting the valuable part of milk by itself, and the cheaper elements by themselves, and no damage done to, or waste of either.

The far-reaching scope of this later revolution, to be even partially comprehended, has to be illustrated by applying the figures and facts to the manipulation of large bodies of milk, such as our factories are daily handling, and which are computed by the million pounds.

*The Extractor Ahead.*

Bear in mind that the most potent fact of the separator is that it can abstract some more fat from any normal milk than any gravity process can—both using the well-mixed milk on the farm, as it is milked; and it can abstract quite a good deal more per cent. from gathered milk, at the factory. Bear in mind, also, that one of the potent facts of the extractor is, if desired, it can be used as a separator to make cream for family use, or to peddle in cities, or to make cream in the factory to be soured before churning, for those who yet think they must make sour cream butter—and when so used it will separate 50 per cent. more milk in an hour than the medium Danish-Weston — the one of that kind in common use — and as compared with the largest size De Laval, or common Sharpless separator, it will separate 60 per cent. more, in the same time.

*Its Advantages.*

The gain at this point, the dairy farmer can see at a glance, augments the per cent. of sweet skim milk he may take home each morning, that is rescued from the sour milk tank, and a stay of 24 hours in such a tank. Bear in mind, too, that the extractor does its work, when making butter direct—which it soon will do for all the milk that comes to it—at a temperature of 60 degrees F., or customary churning temperature; while machines that are separators, and nothing else, have to do their work at 75 or 80 degrees, and thus nearly every day in the year require the milk to be treated with artificial heat, while in warm weather the milk to be run through the extractor, must be cooled instead of being heated, and only requires to be warmed when the weather is so cool that warming the milk to 60 does no damage. There is an immense saving in the feeding value of skim milk involved in these practical facts. Bear in mind, further, that another potent fact of the extractor, when used as such, to make butter direct, is, that it has no use for either cream-vat or churn, and that it saves from souring about 20 pounds of milk in the cream that comes from each 100 pounds of milk, and at the same time rescues from the buttermilk in sour cream 2 hundredths lbs. 25-cent butter from 4 hundredths lbs. the churn leaves in it. Apply these two savings t

one and a half million pounds of milk, that comes to the year-round-operated factory, that has 10,000 pounds its best day in early summer, and computing that 20 pounds of sweet skim milk is worth double the same weight of sour buttermilk, and that the milk is worth 4 cents, and the buttermilk 2 cents, then in the 300,000 pounds of buttermilk there would be in 1,500,000 pounds of whole milk skimmed, there is a loss of $300.00 in the feeding value to the farmer, and of 600 pounds of 25-cent butter, worth $150.00—the two losses combined being $450.00—just the price of the wonderful machine that may be used to save both losses, and thus pay for itself, every time it ran through so much milk.

*Sweet Skim Milk.*

I go to Prof. X. A. Willard, to get the relative feeding value of sweet skim milk, the solids of which are about half and half caseine and sugar of milk; while in sour buttermilk the sugar of milk has dropped out, or, in other words, turned to acid — the stuff that makes animals grow poor.

But perhaps some bewildered farmer who has worshipped all his life at the shrine of a sour swill barrel, and thinks there is virtue in the sour fumes that come from it, may ask, "Has not sour buttermilk some feeding value in it?" Why, yes—just about half as much as same volume of same article, sweet. Don't understand me to say it is worthless.

I aim to be, and will be fair; and therefore will say that this loss in feeding value on the sour buttermilk would not occur, if the cream from the separator was churned when it was sweet. But the loss of fat in the buttermilk in churning sour cream, would occur, and I know of no way to recover it. Then again, if cream is churned at all, the expense of the cream vats and churns comes in, and also a more expensive factor still, comes in, if the cream is churned sweet—that of losing still more fat in the buttermilk, unless it is centrifuged over again, as the plan of Prof. Meyers, of the West Virginia experiment station, involves.

In any event, the use of a separator involves the handling of the cream through the cream vat and churn; and if the cream is churned sweet, the additional expense of handling and centrifuging the buttermilk by itself, has to be incurred, or the yield of butter runs down. I will not say that plan involves the re-churning, by itself, of the cream obtained from centrifuging the sweet buttermilk, for I suppose that can be safely mixed with the cream of the next churning.

*A Revolution in Butter Making.*

Now compare all these frantic, laborious, and disagreeable efforts to save the feeding value of the by-product, and save the waste and costs of churning either sour or sweet cream, with the steady pegging away of the extractor, that draws from 1,200 to 1,300 pounds of milk per hour—according to the richness of the milk—from the receiving and storing vats, and finishes the job of getting partly washed granules of butter, as it goes smoothly along, and you will then see and know the far-reaching sweep of the impending revolution in butter-making, that is surely coming, and is nigh. It will require less power to propel the lesser amount of machinery, less square feet of floor room in the factory building, and so less cost to build, and less high-priced skill in the butter-maker; for the most intricate duties of butter-making with a churn, those requiring the most skill, experi-

ence and judgment, as well as the hardest, most disagreeable part of the work, lie between the time of obtaining the cream, and the "coming" of the butter in the churn; and all that the extractor does automatically, while the operator looks at it, does some other part of the work, or reads his newspaper.

Some of this, you may say, is theory—opinion, merely, or a computation of what may be. Give us facts — results—yields from milk of a tested or substantially known quality. Fortunately, though the running of an extractor by our firm, is comparatively a new business, set up Dec. 22d last, and we have run it to do practical business with and earn money, rather than to make reports about, still I have a few facts I will give you for what they may be worth, and say that now that we have a milk tester in operation, we can make, in the future, more valuable reports than we can now.

*Winter Dairying.*

The patrons of our factory did not "catch on" long enough ago to the great advantages of winter dairying, so as to have many of their cows come in, in the fall, as more than half of them should. But they have got fairly started, and will do better in the future. The result is, yet, that we get our best and richest milk, in November and December, from the "stripper" cows that have been milked all summer. A few have their cows come in, in the fall, but quite a number have cows that are fresh, soon after the 1st of January, having moved so far towards winter dairying. The result was that many of the stripper cows dried off about the first of January, and the fresh cows came on, in few numbers, to take their place. But the sum total of milk for that month was only 50,014 pounds.

*Babcock Milk Tester.*

We had not then a Babcock milk tester, so as to make analyses often; but we had the milk of a day's run, of substantially the same kind of milk, tested, and found it had in it 3.7 per cent. pure fat, and the butter had in it 81.67 per cent. fat, and 18.33 per cent water, salt, caseine, and ash. From said 50,014 pounds of milk there were made of cured cheese and packed butter, as sold, 852 pounds of butter, and 4,416 pounds of cheese. The yield, therefore, was 1.70 pounds of butter, and 8.83 pounds of cheese, or a total yield of 10.53 pounds from each 100 pounds of milk, of the quality stated. Milk of that quality would have made 4.36 pounds of commercial butter to the hundred, and given the patrons back 95 pounds of sweet skim milk. The same milk would have made not more than 10 pounds of full cream cured cheese, and some better whey than it did make. You may ask, how I account for more yield of butter and cheese, than for full creams? I reply, in two ways: First, by using an extractor to get out part of the fat, the milk was left so that the rennet could impart a holding power to the caseine, so that all, substantially, of the fat left in the milk was saved; and second, had the rennet not been applied to cold milk, there would have been a loss in the whey of part of the fat that was saved.

*Per Cent. of Cream in Cheese.*

I know I am confronted at this point by the claim of some who have been to school long enough to have learned better—that all the fat, even in 5 per cent. milk, can be incorporated in a cheese without using so much rennet as to damage the flavor; but with me a Fairbanks scale says it cannot be done, and

so I don't believe it can be, unless more skill than I have, is brought to bear upon it. But even if it can be done, by ever so learned and wise a professor of cheesemaking, I say distinctly, it is financial stupidity to do it; for 4 per cent. milk is rich enough in butter fat to make the finest, highest selling cheese of the world; and the other pound of butter is worth more, as butter, than to be half wasted in an extra buttered cheese; for it is neither so palatable or healthful to eat, nor will it keep the kind of flavor that brings cash, so long.

*Comparatively No Loss.*

Further: At the time the said test of milk, was made, we were running the extractor at the speed of 5,800 revolutions per minute, and the analysis showed there was .3 of one per cent. fat left in the skim milk. That is pretty close skimming for any centrifuge, doing regular, practical work. But we have since speeded it to 6,200, and found that the skim milk contained only .1 of 1 per cent. of fat. Such saving, if it can be regularly effected, means 2 pounds of fat saved from each 1,000 pounds of milk, and escapes all the perils of churning besides, as well as saves losses in buttermilk.

*Summary.*

Having given you a review of the facts involved in the successive "steps that have been taken in the progress of extracting fat from milk," I submit these views and facts, to your candid consideration; and if they shall lead you to employ means to get more of the valuable elements that are really in your milk, out of it, and the avails into your pockets, and so enable you to make of yourselves abler, and broader, and better men and women, because you have more of this world's goods with which to fight the battles of life, and enjoy more of the blessings that an honest prosperity will put within your reach, then I shall be amply rewarded for coming, and looking into your "speaking eyes" while I have endeavored to tell you wholesome truths. I have, during the long years, now gone to the returnless past, sought to know the basic truths of the dairy business, with a heart inclined to take a step up and on, wherever the head and judgment led the brightened way; and in that spirit I have given you to-day, of the very best I know.

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There being no time for discussion, Mr. J. H. Monrad of Winnetka sent in the following remarks:

I listened with great interest to Mr. Smith's paper (read at Waupaca Round Up Institute), and as I was present, I cannot let it go on record without a protest on a few vital points which may mislead those not posted.

First, Mr. Smith claimed as an advantage that the milk for the extractor need not be heated up as high as for the separator, but forgot to mention that in summer, when we receive the bulk of the milk, it must be cooled down to 58 or 60. And allow me to say that is quite a job, and practical creamery men will rather heat milk 15 than cool 5 degrees.

Next, Mr. Smith forgot to mention the extractor buttermilk at all. As this forms from 8 to 10 per cent. of the milk, and contains from 1 to 4 per cent. fat, it must be run through again, thus leaving 1,000 pounds extra to manipulate in a creamery with 10,000 pounds of milk, leaving again another 100 pounds of buttermilk to be reworked, and so on.

Thirdly, Mr. S. claimed advantage of saving room for and cost of churn; yet

it seems to me something like a churn is needed to wash the butter in.

Fourthly, Mr. S. left the impression that there was a present demand for extractor butter. This is not so as far as our western market is concerned. While perhaps a private trade might be worked up for such butter to the tune of a few hundred tubs a week, the bulk of our creamery men and dairymen cannot afford to "educate the consumers," as friend Goodrich rightly remarked. But even if the market would take sweet cream butter, practical creamery men will find it better to run the machine as a separator (and a good one it is).

The very fact that the extractor can manipulate 2,300 pounds as a separator, but only 1,200 pounds as an extractor, proves the fallacy of combining in one two machines (which require different temperatures to do their best work), and as to saving in the cost, Mr. S. seems to forget that one machine run as separator will do the work of nearly two run as extractors, and thus leave at least $400 to pay for vats and churn, etc.

Cheese makers who, like Mr. Smith, insist upon educating consumers to use cheese made from 3 per cent. milk only, may use it without re-extracting the buttermilk, as they can use it in their cheese, but I deem it a sorry day indeed when Wisconsin cheese makers first commenced that kind of "education," and trust to see the day when they will not be afraid of making cheese from 3.7, or even 4 per cent milk. As yet few factories will average more than that.

I also challenge the attractive but delusive picture of the operator of an extractor "reading his newspaper" while he is running it.

As the loss in buttermilk from properly ripened cream is not more than 0.4 (at least I would dismiss a butter-maker who left more), I fail to see how Mr. S. can lose 8 cents' worth of butter, as 0.4 per cent fat in 16 pounds of buttermilk (from 100 pounds milk) cannot make more than 0.073 pounds butter, which at 25 cents only makes 1.83 cents. If he does lose 8 cents' worth of butter in the churn from 100 pounds of milk, I pity the man indeed.

## CHEESE MAKING.

By W. H. Phillips, Waupun, Wis.

The first thing to be considered in any undertaking is the foundation we lay, and in nothing is this more important than in making cheese. We may give volumes of instruction on the way to handle milk after it is delivered at the factory, but the beginning is not there. Some trifling neglect on the part of those who care for the milk before delivery will set at naught the most skillful maker and the most approved methods.

Great care is necessary on the part of the farmer in order that the milk may be of the best quality and in the best possible condition when the cheese

maker takes it in hand. Let us notice some of the steps by which this result is obtained.

***Proper Food.***

First, then, let us see that our cows have proper food, avoiding anything which will give a taint to the milk. Especially in the spring is this caution necessary, for if cows are turned out on low bottom lands they are liable to find leeks, which ruin the flavor of the milk. Stagnant water is another most fruitful cause of torment to the cheese-maker. If you have pools of stagnant water in your pastures, by all means fence them in, and do not on any account allow your cows to have access to them. Pure water is as essential for your cows as for yourself.

***Salt Regularly!***

Another point which we must by no means lose sight of, is the regular salting of the cows. Salt seems to be a physical necessity of some animals, and for none of them more than the cow. It has been proven by experiment that the salt given to cows has an important effect upon both the quantity and quality of the milk produced. An English dairy authority gives these figures as the result of experiments in feeding cows salt: "Cows without salt for the period of a week shrank from 14½ to 17½ per cent. in the quantity, and the milk was of an inferior quality, which on an average turned sour twenty-four hours sooner than milk drawn from the same cows receiving salt every day." Then by all means let your cows have salt every day. I would recommend keeping rock salt where the cows can have access to it at all times. They will be sure to taste it, and the effect on the milk will be to improve both quantity and quality.

I have touched on but a few points regarding the care of the cow, but I wish to emphasize this: It is of the utmost importance that the cows be in a healthy condition in every respect. To this there are no exceptions.

***Clean Stables.***

I wish to say further, that the stable in which your cows are kept and milked should be clean and neat. We want milk which will not remind us, by its flavor, of the barnyard, and public opinion is slowly arriving at the point where perfect cleanliness will be required, not only of the stable and its surroundings, but of the milker himself. If you enter a cheese factory, you desire, and rightly, to see the maker clean as to his person and his hands. The man who handles the milk on the farm should also be clean and have clean, dry hands. A stable, even if kept reasonably clean, will still have some bad odors, and therefore, as soon as you have finished one cow, take the milk to the can and empty it. The milk-stand should be at some distance from the barnyard, in a place where there are no bad odors. All utensils should be carefully cleansed each day. Too much care cannot be exercised in this, as a great measure of the poor cheese can be traced to this very source.

***Filthy Cans.***

I have this summer examined cans where I could scrape quantities of dried milk from the seams, and this when the housewife supposed she was washing them carefully. I run some risk in the statement I am going to make—for I have incurred the wrath of more than one farmer's wife by saying it—but the fact is, that a great many do not know how to wash cans properly. If the good housewives will bear with me I will give them my way of washing cans. First

then: Wash them at once, as soon as they come from the factory—do not allow the milk or whey to dry on, as it will then be almost impossible to remove it. First rinse the can with cold or lukewarm water—never hot at first, as that would cook the whey on. After rinsing, wash thoroughly with hot water—I do not think it necessary to use soap, certainly not soft soap, as that leaves an odor difficult to get rid of. Especial attention should be paid to the seams, as there is the hiding place of the imp that spoils the cheese. A small brush for the seams would be a good idea. Finally, scald with clear hot water and turn in the sun to dry.

You may object to my spending so much time on these points, but it is of the utmost importance that these things be attended to. For some years past we have heard much of bad luck in cheese factories. Cheese has been sold at 5, 4, and 3 cents a pound, or has been taken out and buried, until if we lived in olden times, we certainly should have said that the milk was bewitched. And it is. Little elves lurk in the milk-can, in the pan, in the strainer, waiting to catch the unwary and ruin the best milk ever produced.

### *Cooling and Aeration.*

A very important point in the care of the milk is its proper cooling and aeration, especially the latter. Milk should be aerated until all the animal heat is out of it before cooling with water, as is the custom of most farmers

The best means to this end is the aerator, which can be obtained at a reasonable price. If you have not an aerator then the next best thing is a gallon dipper, with which you may bale the milk for 15 or 20 minutes, then let it stand for half an hour or an hour, after which place water around it and stir it again. Then leave the cover off from the can, so that the air may have free access to it all night.

### *The Ordinary Factory.*

Supposing the milk now to be ready for delivery at the factory, let us look at the building which is to receive it. The ordinary Wisconsin factory is a wooden structure, guiltless of paint, or else painted a dingy red. The surroundings are uninviting, and your nose gives you notice of the presence of the factory by the odor which comes from the neglected whey tank and drain. I have in my mind's eye factories which, for dirtiness and uninviting exterior, would suffer by comparison with a well-kept pig-pen. Let us enter and see if the prospect brightens. We meet the maker at the door, with clothing smeared with grease and whey. and if he is without a pipe, which shall shed its ashes over the curd, we will thank our lucky stars for this grace.

The interior of the vat-room corresponds to points already mentioned—floor covered with whey and dirt, flies festooning the ceiling and the various utensils, and meeting untimely fates in the vat itself.

We are tempted to "drop into poetry" and exclaim:

> "Vice is a monster of such frightful mien
> That to be dreaded, needs but to be seen;
> But seen too oft, familiar with her face,
> We first endure, then pity, then embrace."

Imagine one unused to such sights, brought face to face with some of these "awful realities," and you see horror on his countenance. A slight acquaintance causes him to pity those who must endure, but if the acquaintance is followed up, we find him "embracing the flies," or in other words becoming like the average cheese-maker, who at best looks upon

the flies as a necessary (?) evil. A word about this cheese-maker. He is probably one of those who learned to make cheese about twenty-five years ago, or else had one of the veterans for his teacher. He is wedded to old methods, and if he is here to-day will sniff at the idea that there can be anything about cheese-making that he does not know.

### *The Future Cheese Factory.*

But let us turn from this picture to look on another. Behold, then, the model cheese factory as the future shall see it, and as indeed there are a few bright examples to-day. This is a neatly painted building, and its surroundings are neat and tidy. I should not be surprised, nor at all displeased, to find a flower-bed near it. No foul smell from the whey-tank greets us, for that is so arranged that it can be scalded out each day after the last patron leaves. The whey also is scalded and kept sweet for patrons' use.

We find screens at every window and door of this model factory, thus promising cleanliness within, for many factories are kept reasonably clean but for those pests, the flies. Within, we find the best apparatus, for the owner has learned by experience that a poor article is dear at any price.. This factory has a sink well supplied with hot water for cleansing the various utensils. I take pleasure in introducing you to the cheese-maker, for I know he will win your approbation. The successful cheese-maker is an intelligent man. He has some brains and knows how to use them, some ideas and a desire for more. He is not afraid of work. He is anxious to learn and willing to help others. It is more than possible that he has seen the inside of our excellent dairy school. In short, he is a live young man, who is able and willing to keep abreast of the times. When this maker labors with the farmer in regard to the proper care of his milk he sends him home resolved to improve, for the cheese-maker's speech is oily, and he backs up his sermons on cleanliness and care with such steady practice on his own part that his arguments are unanswerable.

### *Intelligent Cheese Making.*

I will give you now the method by which I believe this model cheese-maker will make his cheese. We do not claim that the method is perfect. We hope and believe that many improvements will yet be made, but this is the result of our experience so far. Before putting in the rennet, ripen the milk by the application of heat to such a degree, that not more than three hours will be required between the addition of the rennet and the development of acid sufficient for the removal of the whey. The ripening may be hastened by using a "starter" of milk which is slightly sour. However, loppered or thick milk should never be used for this purpose. Enough rennet should be added to coagulate the milk ready for cutting, in from thirty to thirty-five minutes, at 86° Fahr. The rennet should be diluted by using one gallon of water to one vat. After curd is firm enough to break clear over the finger, cut as fine as kernels of corn. The application of heat should be delayed for at least 15 minutes after the stirring has commenced. The temperature should be raised to 98° and kept there till the whey is drawn. Care should be taken to so apply the heat and perform the stirring that the curd particles will be so dry before the development of acid is perceptible, that after being pressed in the hand, they will fall

apart easily. After the whey is drawn off, the curd should be kept at a temperature of 98°. Colder than 94°, the development of acid will be hindered, and moisture will be retained in it during the souring process. The presence of such extra moisture in the curd at this stage will leave the cheese with a weak or pasty, or tallowy body, according to the degree of acid development permitted. After drawing nearly all the whey, tilt the vat and shove the curd to the lower end. Place the racks in the upper end and throw the curd upon them to mat. After the curd has matted, cut it lengthwise of the vat and in strips 8 inches wide, then turn it over to mat on the other side. After five minutes, turn again and pile it two layers high. Watch closely, and as soon as the whey begins to collect in pools on the surface, turn again and pile one layer higher, and so continue until it is all piled in layers. Constantly turn and re-turn until the curd is ready to grind. After grinding, air the curd well before salting. After salting, let the curd lie in the vat until the harshness caused by the salting gives way to mellowness. Then put in press with a temperature of 84° F.

It would be impossible, in the time I have, to enter upon the details of curing the cheese. I have briefly sketched our method of making, and if there are any questions upon it I will answer to the best of my ability.

### *Conclusion.*

A few words now concerning the present prospects of our business, and I am done. By referring to the annual report of Food Commissioner Thom, you see that 60,000,000 pounds of cheese are made annually in Wisconsin. I believe I am safe from contradiction when I say that on two-thirds of this there is an average loss of from 1 to 1½ cents per pound. At 1½ cents this means an annual loss of $600,000, to the farmers of Wisconsin.

Various causes might be assigned for this. I will speak of but three. First, then, the reputation of Wisconsin cheese has been injured by unscrupulous men whose greed for gain has led them to put filled cheese on the market, and so injure the sale of honest goods. By wise laws, carried out by our excellent dairy and food commission, we hope to remedy this. It remains, then, for us, as farmers and cheese-makers, to see what we can do to help ourselves. Two other causes may be assigned for our loss of credit. First, the unskilled maker. Second, the careless farmer. I believe that the cheese-maker should use every possible means to make himself master of his business. No maker should be employed unless he is known to be thoroughly competent. He should, if possible, have had a course in our dairy school. But granting all this, it will still be impossible for him to make No. 1 cheese from poor milk. The farmer, then, should see to it that his part of the work is carefully and conscientiously attended to.

Finally, let not the farmer and the maker continually blame each other if things do not go right, but as partners having a common interest in the success of the business, let both pull together and be equally anxious to do anything and everything that will contribute to the desired end.

# CHEESE MAKING.

By THOMAS J. FLEMING, Watertown, Wis.

*Mr. Chairman, Ladies and Gentlemen:*

I am very glad that my friend from Waupun, who has just preceded me, has most effectually covered the ground relative to success in cheese making. I simply want to say that I earnestly believe every word of what Mr. Phillips has so ably expressed on that subject.

***Fourteen Hundred Cheese Factories.***

Cheese manufacturing in Wisconsin is not receiving the attention that, in my opinion, it merits. There is no branch of agriculture that has developed such a rapid, permanent and profitable growth during the last decade, as that of cheese production. That being so, it behooves every one of us to give to it that thought and study that it deserves. This industry is represented in Wisconsin by fourteen hundred cheese factories. Or, expressing it another way, by sixty-five thousand of our farmers.

I believe that the future success of this industry will not depend so much upon the quantity of cheese we manufacture, as it will upon the quality of the same, because it is the quality that is going to affect the consumption.

Give to the cheese consumers of this country a cheese at the time and in the condition that they demand it, and consumption will inevitably keep place with production.

***Wisconsin, a Dairy State.***

I sometimes think that we, in Wisconsin, do not realize the natural adaption of our state to this line of work. I believe that it is one that will not meet with formidable competition from the broad and fertile west.

What is it that makes the real success of cheese production? It is something more than the two elements of its composition, namely casein and butter fat; to these must be added, skill. It is skill largely we sell when we sell our good cheese. You see before you two cheeses, they have the same percentage of butter fat, the same per cent. of casein. One of them sells for seven cents per pound, the other for ten. Why? Because the man who made that cheese for ten cents a pound has coupled with those two ingredients, skill, thought and study.

***Flavor Important.***

What are the points which determine the value of cheese next to the proper per cent. of butter fat? They are these: flavor, texture, color and salt. And of all these, flavor is the important one. It represents two-fifths of the entire value, and it is the difficult thing to get. What is necessary to get that good flavor? It is necessary to closely adhere to the suggestions that have been made by my fellow cheese instructor, Mr. Phillips.

In my opinion, the most important element in this matter is the water that the cows drink. The water enters immediately into the stomach, and it carries through her system the elements of food, which enter first into the stomach, undergoes the process of digestion, then into the blood, then into the mammary glands, and from thence into the pail. In 100 pounds of milk, there are 87 pounds of water. Now, do you think it possible that your animals can go to a stagnant pool or any other place

where the water is objectionable in color, smell and taste, and takes 87 pounds of that water into their stomachs and evolve from it 100 lbs. of good milk.

Another point is to see that the milk-is done cleanly, and do not cool that milk so quickly as you have in the past. The general practice in Wisconsin is to take the milk as quickly as drawn from the cow and put it into cold water. That is an objectionable practice. The milk before being sent to the cheese factory should be well cooled and aired.

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### *DISCUSSION.*

QUESTION — Will that same process of cooling have the same bad effect upon butter?

MR. FLEMING — It is not objectionable for buttermaking because we utilize only the butter fat, the lightest solid of the milk, which rises to the top, away from the objectionable elements. Indeed, we would advise you to put the milk into cold water immediately, for butter making, because it seems to cream in that way better than in any other. But when we undertake to manufacture cheese, we have to go down into the bottom of the can, and utilize the serum of the milk, in which we find incorporated these objectionable odors.

MR. MCKERROW — If you have very rich milk, do you consider it a good plan to skim it down to the level of three per cent?

MR. FLEMING — I am decidedly opposed to the use of the skimmer. I believe that it is one of the curses which have fallen upon the cheese industry of Wisconsin. I believe that the question of economy in the erection of cheese factories is a very important one. There are many places in the state of Wisconsin where farmers have gone into the erection of factories that have cost at least one half more than they should, and in some localities that will never receive sufficient patronage to make them successful.

MR. HYATT — I am convinced that there is no practical way for farmers to control their milk until it goes directly to the consumer.

MR. PHILLIPS — I do not believe that it is a good idea for the farmers or any one else to listen to every gentleman who comes around to advertise these creameries and cheese factories.

QUESTION — How expensive a factory would you put up, if you were going to build for, say a capacity of 20,000 pounds of milk, a combined factory?

MR. FLEMING — It hadn't ought to cost over $3,800.

MR. J. A. SMITH — Make it $3,000.

MR. FLEMING — If that was my line of business, I think I could do it, and make fair wages, and it would be as it ought to be.

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### *RESOLUTIONS.*

Mr. Allen in the chair.

Mr. Row offered the following resolutions, which were unanimously adopted by the Institute:

WHEREAS, The State Board of Regents kindly selected Waupaca for the fifth annual round-up Institute, and

WHEREAS, Supt. Morrison and his corps of Institute workers have given the people of this section the best Institute ever given in this state; therefore, be it

*Resolved*, That the unanimous and heartfelt thanks of the people attending the Institute be and hereby are extended to the State Board of Regents and Supt. W. H. Morrison and his efficient corps of workers for their earnest

and successful efforts in making this Institute the success it is. Be it further

*Resolved*, That it is the sentiment of the people of Waupaca, Waushara and Portage counties that these Farmers' Institute courses should be continued so long as the sun shines and the government reigns at Madison.

Mr. Thom offered the following resolutions, which were adopted by the Institute:

WHEREAS, The several committees of Arrangements, Exhibits, Programme, Music and Finance, have put forth their best efforts to make the fifth annual round-up the signal success that it has been,

WHEREAS, The persons who have taken part in the musical programme have performed their duties in a manner most acceptable to all who have been present, special mention being made of Miss Belle Smith and her "reserve farmers,"

WHEREAS, The hospitality of the good people of the city of Waupaca has made the visit of the Institute force both pleasant and profitable; therefore be it now

*Resolved*, That the sincere and heartfelt thanks of the institute workers and of the farmers and their wives and children from abroad be extended to these several committees and to Waupaca for making this round-up one that has been one of the most interesting and instructive in the history of Wisconsin Institutes.

SUPT. MORRISON—I wish that I had time to thank you for the resolutions which you have passed, but I cannot find words to do so, and you know my heart. You know that I do thank you from the very bottom of my heart, and and as we have considerable more work, without any more thanks, we will proceed to the remaining business of the Institute.

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# ADVANTAGES OF THE CREAMERY.

By N. G. WILLIAMS, Bellows Falls, Vt.

*Mr. President, Ladies and Gentlemen:*

I came here for the purpose of visiting your institutes and seeing how you conduct them. Thus far I have been very much pleased, and I have wished that many of my Vermont brethren could be here and see how they do things in Wisconsin. You may be aware that Gov. Hoard was with us at our annual meeting, and I can assure you we enjoyed him very much, and hope to have him again.

*Dairying in New England.*

You may be interested to know something of our methods of dairying in New England, which differ from yours in many ways. There are in New England something like 250 butter factories, three quarters of which are run upon the cream gathering system; the remainder being whole milk factories using separators. The rest of the dairying is private or farm dairying. In the northwestern part of our state, in Franklin county, is

a gigantic institution with a capital of $100,000, running centrifugal machines, which is hoping to absorb the whole of the milk of that county. It is to begin operations in a few days.

*Co-Operative System.*

There are about seventy cream gathering factories in Connecticut, which are run upon what is called the co-operative system; that is, the farmers own everything, buildings, machinery, etc. They unite to form a corporation under the laws of the state, furnish the capital, hire the butter maker and cream gatherers, and sell the butter and divide the profits. In 1891 the average price received by the patrons at the twelve factories of which I have a report was twenty-one and one-half cents per pound. The cream is taken at the farmers' doors and there is no expense to the patrons for gathering. Another thing that we make a good deal of, and of which I have heard very little here is the value of the skim-milk, which is kept at home. Many of the farmers raise hogs upon the skimmed milk. Prof. Cooke, of our station, tells them that the skimmed milk is worth 24 cents per hundred to feed to hogs that bring five cents per pound, dressed weight, the price at which they have been able to sell the them past year. So much for the cream gathering system.

*The Factory System.*

The factory system with whole milk is found in a few instances. Usually the factory is owned by a firm or by an individual who buys the milk at the best prices he can and sells the product. Many of the factories stamp most of the butter into pound prints, wrap in parchment paper, and ship in return cases, and this is one reason why they get larger prices than you do. Within a few weeks the product has been selling at between 35 and 40 cents at many of the standard factories.

We do very much more private dairying, proportionately, than you do. A very large proportion of the private dairy butter is put in prints and sent to market to regular customers. Being near the large cities it is possible for the dairymen to find their own customers and get handsome prices. Some of our fancy butter makers are getting as high as 70 or 80 cents per pound, although, of course, those are exceptional cases. Many of our dairymen contract their butter at 25 cents the year round. Some deliver the butter on the cars at their station, while others deliver in the cities. Others get 30 cents and even 40 cents a pound.

*Abandoned Farms.*

You have heard about the worn out farms of New Hampshire and Vermont. It is true that there are farms there that can be bought for very much less than the buildings cost. The young men have gone west; but foreigners are now coming in, partly through the exertions of the state commissioner. These new comers are reported as doing well. They have the advantages of near-by markets. Fertilizers have to be bought the first year, at least, but if a man runs a dairy he makes his own fertilizers after the first year and he is bound to make a good thing out of his investment.

In regard to the cost of creamery buildings, I will say that the dairy commissioner of the state of Connecticut has compiled a report showing the cost of the creamery buildings of that state. Most of these buildings have in connection with them a tenement and the butter maker's family lives in the second story. I believe, however, they are abandoning that plan now as not the

wisest course. The average cost of the creamery buildings in the state of Connecticut, taking all the creameries in the state, was a trifle under $3,000, including the apparatus and paraphernalia necessary to do the work. Factories without tenements are built and equipped for less than $2,000. Several as complete and substantial buildings as there are in New England were constructed for less than $1,000.

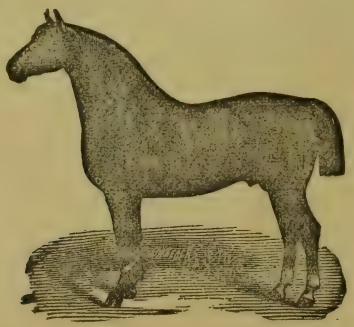
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*DISCUSSION.*

MR. FLEMING—What would be the cost of a separator creamery with an ice-house and a capacity of 6,000 pounds of milk?

MR. WILLIAMS—They can be put up for $2,000 and upwards. There is, in Saratoga County, New York, a creamery building, 72 feet long, 26 feet wide, containing an ice-house, refrigerator, cream-room, wash-room, and engine-room, the building so arranged that the cream runs by gravity from the place where it is received until it reaches the churn. That building, above the foundation, with the apparatus, cost $2,000. With the foundation, the cost was about $2,500. This does not include a separator.

I have heard a great deal about the poor returns of farming in the West, and have picked up some facts here which I shall be glad to carry home with me. One of your speakers stated that his potatoes cost him seven and one half cents per bushel to raise and harvest; and another gave the cost as eleven cents, including the interest on his investment. Being asked the net profits, they replied, from sixty to seventy cents per bushel. One of these speakers raised from 5,000 to 6,000 bushels, the other from 9,000 to 10,000 bushels, and sold them for from seventy to eighty cents per bushel. These same farmers, no doubt, were among those who used to make such complaints of the great profits on sewing machines that they had to provide their wives and daughters with. Machines that retailed for $50 to $60 cost to manufacture from $10 to $15. It will be seen that the manufacturers' per centage of profits were very much less than the potato raisers'. I shall go back to manufacturing New England and tell them that the profits of farming are very much greater in Wisconsin than the profits of manufacturing in New England, and therefore they had better dispose of their shops and go west and raise potatoes, as their gains will increase much faster in Wisconsin than in the east running manufacturing establishments.



# CREAMERY OR CHEESE FACTORY.

By S. FAVILLE, Madison.

### *Number of Cows.*

Shall we build a co-operative butter or cheese factory? I answer yes, in any community where there is a fair prospect of sufficient patronage so that it will prove a financial success.

How much encouragement will warrant the starting of either? The milk from at least 300 cows to start with, and a reasonable certainty of increasing to 500 or 600 in the near future. Why demand so large patronage? So that you will be enabled to employ the best skilled labor and to purchase the most approved machinery, instead of cheap labor and imperfect machinery, as you would be obliged to do with a small patronage. How shall the factory be built? By a stock company, by all means. Make the shares small, so that every one intending to furnish milk (though it be ever so little) may take one or more shares. In that way you secure a large number of stockholders, and each one is interested in the success of the enterprise to the extent of his stock, and their united influence will make success almost a certainty. And then, again, when the average man becomes a stockholder in a concern of that kind, he will stand the discipline necessary to make him an intelligent milk producer. But when he is not, but has only the interest at stake of the amount of milk he is furnishing, and any attempt is made at discipline, or even positive instruction, he will coolly advise the cheese or butter maker to go and make his satanic majesty a visit and he will take himself off to some other factory, or will sell his cows, so in either case the factory will lose the support they expected from him. It is not necessary that I should, in this paper, go into the details in this matter. Every business man will understand that a concern of this kind will need its officers, such as president, salesmen and directors, etc., etc. Of course, the plan I propose is not the only one. They may be started as a private enterprise, and may succeed fairly well, but the experiment is hazardous for the man putting his money into it, as I know to my cost.

### *Advantages.*

What are some of the advantages of the factory when started?

The first, and perhaps the most important, is that it puts the small dairyman on an equal footing with the large one. It enables him to put his product in shape so that it commands as good a price as the large dairyman's. This he could not do if he made his butter at home. The reasons for this are so plain that I do not need to repeat them. And then it puts all, both large and small dairymen, in shape so they can get the very highest price for their goods. Not only the average quality will be much improved, but it is a rule in commercial transactions that small quantities have to seek a market, while to large ones the market comes, and at better prices. This is an advantage that is very important. Every farmer who has tried trading his butter at the corner grocery for other goods will fully appreciate this when he tries it.

And another thing. The factory relieves the already over-burdened housewife of the labor of making the butter. The problem of how to provide the indoor labor is becoming so serious and so difficult of solution, that anything that tends towards light on this subject is well worth our consideration. Farm machinery has done very much to lift the burden of out-door work, while so far very little has been done to make the house-work lighter. Almost everything has to be done much as it was in our mother's day. I do not forget that we have the sewing machine, with its wonderful ability to add stitches. And I also remember that the demand for added stitches in the ladies' wardrobe (in the way of ruffles and such things) has fully kept pace with the ability of the machine to furnish them. So that it really amounts to but very little as a burden lifter. And then there are some other things, like the washing machine (which, by the way, would be a good thing if with each one you could send along a good strong man or a steam engine to run it), and other things that are some help. Yet the fact remains that the house-work is the most serious labor problem that confronts us to-day, and the butter factory comes in to help us out to some extent. And then the butter or cheese factory is a sort of a farmers' institute.

### *Pooling Experience.*

I believe that one of the important benefits derived from the institutes that have been held in the state these past years comes from the farmers getting together and talking over their business and comparing notes, comparing methods, discussing the ways and means, etc. And so the factory calls the farmers together, not once in the winter, but every day in the week. And the address that is delivered to them by the scale beam when their milk is weighed is one that they are compelled to heed. Superintendent Morrison may send a man that will discourse ever so eloquently and truthfully about the benefits of the silo, and the average dairyman will shrug up his shoulders, and if he don't say "Bosh!" out loud, will think it and go away and act his disapproval. But when the scale beam tells A. that his neighbor B. is getting one-third or a half more milk from the same number of cows, he begins to open his eyes and look for the reason of the difference. Then will follow a discussion of the ways and means, the care, feed and treatment of the cows come in for consideration. I have known discussions of this kind to last for an hour or two, especially on a rainy morning, and out of them will come a strife to see who shall get the best results. I have known the strife to be so earnest in a few cases that the pump handle was called in to help out when the cows did not quite come up to the mark.

### *Pay for What There Is.*

One other thing, and I am done. The system of paying for milk according to the butter fat that is in it, that is just now being adopted by a good many of the factories, will send a large number of cows that are now being boarded at the expense of the rest of the herd, to the butcher. The man that finds his milk deficient in butter fat will set himself to work to ascertain whether it is the whole herd, or only part of it, that makes the shortage, or whether it is in his feed, or what it is. You will tell me this ought to be done, factory or no factory, and that is true, but the average dairyman will not do it unless he has some extra

stimulus to do so, and the milk test is going to awaken thought and action on this subject that I am quite sure will result in great good to the dairy interest.

*Recapitulation.*

To briefly recapitulate some of the advantages of the factory system: First, to place the large and small dairymen on an equal footing as regards the price they will obtain for their goods, and to enable both to get a better price than they could without the factory, first because the quality will be much more uniform and much better, and because the increased quantity to be found in one place will bring the buyer to the factory instead of being obliged to hunt a market. Secondly, the relief it will bring to the already over-burdened housewife. And thirdly, the convincing education that will come from the lecture that will be delivered by the scale beam when the milk is weighed. And the fact that the Babcock test will demonstrate that a large number of the cows are not paying for their keep, and so will result in sending the unprofitable ones to the butcher.

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# BUTTER-MAKING ON THE FARM.

By C. P. Goodrich, Fort Atkinson.

*Private Dairies.*

I don't wish to say anything to discourage any man from patronizing a factory. I believe that the factories have been a great blessing to Wisconsin; they have lifted a heavy burden from many a tired housewife and put thousands of dollars into the pockets of the patrons. But there are those, who, because they live a long distance from the factory, and for other reasons, find it best to make their butter at home. Now, those who are doing so, or intending to do so, of course want to carry on the business so as to make it as profitable as possible. They are desirous of making an article that will bring the highest price in the butter market, and also to get the most they can out of their milk. The butter that brings the highest price in the market is judged by an expert dealer, who knows the demands of the market, and the scale by which it is usually judged is a scale of 100 points; 45 points for flavor, 30 for grain, 15 for color, and 10 for salt. You see, the flavor is reckoned a great deal the highest, and perhaps it is because it is the hardest to get. The most important point in the whole matter is to know how to get a good flavor that will suit the market.

*Flavor.*

Now where does this desirable flavor come from? It comes mainly from the food, modified in some small degree by the individual character of the cow. For winter food the best things to give good flavor are good clover hay, good corn fodder, good ensilage, good bran, good oats and good corn. There should be fed no damaged forage of any kind. Damaged ensilage will make damaged butter; moldy corn fodder will give a bad flavor to the butter; so will musty

grain. Cows that drink impure water will make bad butter.

In summer the best flavored milk is produced from upland pastures containing a variety of grasses—clover, timothy and June grass. Marsh pasture is not so good, especially if weedy. Some weeds give a decidedly bad flavor to milk. In the season for them there is nothing that will make better flavored milk than pumpkins.

*Condition of the Cow.*

Then the condition of the cow has got to be taken into account. Fresh milkers give a better flavor to the butter than strippers, and cows in an advanced stage of gestation will sometimes give a decidedly bad odor to butter. If a cow is in bad health, it will damage the flavor of the butter, even though it is scarcely noticeable in the appearance of the cow. We must have a healthy cow kept in a clean, well ventilated stable, milked with clean, dry hands, in a clean pail. To illustrate to you what a difference the condition of the cow makes in the product, I will relate some things that happened at my place. My wife is the expert on our farm, in dairying. She can detect a flavor that none of the rest of us can. She said to me one day that the butter was not just right. She examined all the utensils, everything about the dairy house, but nothing could be found that could in any way account for the trouble. Then she said something must be wrong with the cows. I did not know of anything wrong with the cows or with the feed. But the milk of each cow was brought to her separately to examine, and finally she found it. There were two cows that had been giving milk about ten months and a half. As soon as she examined their milk she said, "That is it." That milk was kept out from the rest and fed to the pigs, and the butter was all right. That was in June, when we should be making good flavored butter from good grass.

*Consult the Commission Man.*

A year from that time I had business away, to be gone two or three weeks, and on my way I passed through Chicago and of course I stopped at the commission house. Some of my butter had just arrived, and as I came into the store the commission man said to me, "Mr. Goodrich, what ails your butter?" I told him I didn't know as anything ailed it. He put a trier in and handed it out and says, "smell that." Well, by hard trying, I could detect a faint flavor that was not just right, and I told him so. He says, "I don't know as anybody would notice it, but you know we are selling your butter at a high price, considerably above the market price. The customers are very particular, and I supposed you wanted to know, did you?" Well, of course I did. And I knew what that flavor meant. It was the same thing as it was the year before. I wrote right home then and there, "Stop milking Jane and Molly, their milk is hurting the butter." These were the same two cows that made the trouble the year before. About three weeks after that I came through Chicago again, and I asked the commission man how the butter was, and it was all right.

*Eternal Vigilance.*

And another time, my wife discovered that the butter was not quite right, and as I had been away I asked my boys what kind of feed they had been giving the cows, if there had been any damaged ensilage or anything of that kind. No, the feed was all right, first rate. I asked whether they knew of any of the cows

being out of health. No, they were all right. I told the boys to try to think of anything that could be wrong, and finally, one of them, the hired boy, remembered that one night when he went to milk one cow, a quarter of her udder was a little inflamed, and a little clotty milk came out. Of course, he didn't put that in he said, but he put the rest of the milk in. Now that was gargetty milk, and that is what did it. My boys would have known better than to have put it in. There wasn't to exceed four pounds of milk of that kind in the whole lot, and still in that was seeds of decay enough to taint the churning of fifty pounds of butter, one thousand pounds of milk. When that butter was first made it seemed all right, but we kept some of it for use in the family and in less than a week it was decidedly bad. That small quantity of milk that was diseased before it was drawn from the cow did it.

So you see that "eternal vigilance is the price of" good pure milk, and without good milk it is impossible to have good butter.

### *How Shall We Manufacture?*

Now that we have got good milk, the question is how to manufacture it. There have been, for some years past, two ways of getting the cream from the milk, namely, setting in deep, cold setting, and in shallow setting. There is a newer way of which I shall speak a little, which appears to me, from what I have learned of it, to be a good thing. I refer to the use of the hand separator, or, as it is called, the Baby separator. My son, in northwestern Iowa, who has a dairy of forty cows, purchased one in January. He runs it with a tread power and he thinks well of it. Before he commenced with this separator, he was setting in deep cans in cold water, he was making thirty-three pounds of butter a day from forty cows, twelve of them two-year-old heifers. Since he used the separator he gets thirty-eight pounds of butter daily from the same cows. You can calculate how long it will take him to pay $150 for the separator. He has a contract at twenty-five cents a pound for his butter by the year, delivered at Sioux City, distant 24 miles. There is $1.25 a day, and in one hundred and twenty days he will have saved enough money, to say nothing about the saving in labor, to pay for it. And in one year he will pay for the the machine and have $180 besides.

Now, the deep cold setting is set on the principle that the falling temperature facilitates the rise of the cream. Now if it is set at a temperature of 90, right from the cow, in cold water at 40, you get a fall of fifty degrees, and by the time the milk has cooled down to the temperature of the water, you have practically all the cream. If the milk gets cooled down too much in cold weather before it is set I have always put in hot water to raise it up to 90 or 100 before I set it in the cold water. It makes a surer thing of the cream raising properly.

### *An Old Fogy.*

I am considered by some as an old fogy, and my practices are condemned by some of our most advanced dairymen. I have a set of pans I have used for some time. I can get just as good an article as I could by deep setting, and I can save labor by it. I set my milk in broad shallow pans, each one large enough to hold the milking of the whole herd, the pans are five feet long, two and a half wide, and six inches deep. The milk has never been over four or five inches deep, usually about three. They are so arranged that water runs under and around

the pans in warm weather, so as to keep the temperature of the milk down to 60. I don't use ice, I have got a well of very cold water, and the wind mill pumps the water into a reservoir which is so arranged that it keeps the water moving around the pans. Faucets are arranged so I can regulate the flow of water. In the winter time we have a coal fire in the room, keeping the temperature always at 60. After standing thirty-six hours the milk is skimmed and it is just beginning to turn acid. The cream is put into a can that holds 20 or 25 gallons, which stays right there in the room at a temperature of 60 until we churn, which is four times a week, and then the temperature is raised to 65 in the winter and 62 in the summer. My churn runs with a geared wind mill if the wind blows, and if it doesn't, it is run by a geared up man.

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*DISCUSSION.*

MR. J. A. SMITH—Did you ever have any of your skim milk analyzed?

MR. GOODRICH—I never have, unless it has been done since I left home. I presume it has been. I have got a Babcock tester at home, and if there is a great deal left in it I will have a separator sure.

SUPT. MORRISON—Do you think there is any perceptible quantity of cream left?

MR. GOODRICH—It don't seem to me there can be a great deal, when I get five and a half pounds of butter from a hundred pounds of milk, from not very high grade cows.

MR. SMITH—Why should you have any better success than Dr. Babcock creaming milk in that way?

MR. GOODRICH—I couldn't say. It may be the Lord has endowed me with some power that He hasn't him. But I don't know as I have any better success than Mr. Babcock in that respect.

SUPT. MORRISON—Your average of 357 pounds of butter from your herd has been the result of long years of thoughtfulness and care. It has not been luck. The good Lord loves a kind, considerate, industrious, systematic man, and will shower blessings and success upon him, and I know Mr. Goodrich so well that if Prof. Babcock's test will show him that there is a fraction of an ounce of butter fat left in the milk he will go for it.

MR. GOODRICH—If there is more there, I am going to have it.

QUESTION—How long do you churn this cream?

MR. GOODRICH—Till the butter comes. It takes from thirty to forty minutes to churn. It is churned until the granules are about the size of grains of wheat. Then the buttermilk is drawn off and about a pailful of water to say 15 to 20 pounds of butter is put in, the churn is revolved two or three times, and that drawn off, then as much more water put in, churn revolved, then that drawn off, and that is all the washing it gets. You will perceive that I do not wash the butter as thoroughly as many recommend, because the granules are larger and I use less water. If I should wash thoroughly with brine till it run away perfectly clear when the butter was as fine as clover seed, I know what would happen soon after it got to market—because I have tried it. I should get a letter saying: "The last lot of your butter lacks flavor." "Oh! but," you say, "that is buttermilk flavor." Well, suppose it is? If customers want that flavor and will pay a better price for butter having it, I am going to give it to them. I am making butter for them and will suit them if I can, notwithstanding some

scientific crank may say I am practicing wrong methods. But I am not at all sure that excessive washing and brining does not take out some of the fine flavoring oils as well as the last vestige of buttermilk. I used to bother about setting the cream can in a tub of warm water, raising the temperature by degrees, but now we pour it right from a teakettle, carry it to the churn and pour it in, at the same time stirring the cream vigorously. The butter is taken out and weighed and put on a butter worker, and an ounce of salt to each pound is worked in, and it is left on the butter worker from two to four hours. Then it is worked again, and packed in boxes holding eight pounds, or presumed to. I pack it that way because the customers want it that way, and if the butter that I packed in that box (holding it up) tasted or smelt so that I couldn't eat it, I would do it that way just the same if they wanted it. To do the thing up nice, I line the box with parchment paper, and that prevents the box soaking, which gives an untidy appearance to the box, and makes it come on to the market just as bright and clean as the day it was made. It also prevents the butter tasting of the wood.

QUESTION—How do you market that butter so as to get such a good price?

MR. GOODRICH—That is the main thing that I was after all the time. It is one thing to make good butter, and it is another to get a good price for it. I have seen butter that ought to sell for 30 cents a pound sell for 15 because it was not sent to a butter market, reaching the customer who was willing to pay for it. I have tried a good many different plans, but finally about eight years ago, I settled down to business and I wrote to the commission man that handled my butter, and I said to him: "I am going to ship butter to you every week in the year just as long as I live, and now if you will do as well as you can for me, you can rely on its coming, and I will suit customers if I can. You send me two stencil plates, one with my name on, and another with some device that you will know that it is mine and nobody else knows, so that if I have any butter that it is not just perfect you can sell it on its merits and not as mine, and it won't injure the reputation of my brand." I have got two such plates. One of them, I am happy to say I haven't been obliged to use very much. My butter has gone down there with my name on it. After a while the commission man began to find customers who would be sending back after my butter, and he could get a little more for it, till now for a year it has averaged from 5 to 7 and sometimes as high as 8 cents above Elgin quotation. I don't want you to think that I think that this butter is so much better than yours, I only tell you this to show you there is skill in marketing. My commission man writes to the many people who are complaining that they don't get as good a price as I do, something like this: "We have handled Mr. Goodrich's butter for a great many years. There is a set of customers who are able and willing to pay a good price in order to have that particular brand, and we can't satisfy them with anything else. We charge them an extra price as a penalty for their indulgence." Then he goes on further and says: "We see no reason why you or any one else who will use the same care and skill in manufacturing, and the same methods in marking, cannot do the same," and I don't either.

MR. THOM—I think it is the sense of this convention that all honor should be given Mrs. Goodrich. In view of that I

would like to enquire what percentage of the profits of that butter she obtains?

MR. GOODRICH—She has it all. She allows me to live down there part of the time.

MR. MARTIN—What are you getting for your butter now?

MR. GOODRICH—It brought 32 cents a pound from the 1st of November up to two or three weeks ago. Then it brought me 37 cents. The Elgin price runs from 25 to 28. It cost me last year 13 cents a pound to make this butter. It netted me, taking out freight and commission and package, 24 cents. There is one thing I want to emphasize. If you are going to get a good price for butter when you have got a market like that, you will find it will pay you to be thoroughly honest and careful. When you put a brand on a package of butter, it is just the same as saying, "That is just such butter as I have been sending you right along," and if you are telling them a lie you will soon get paid for it. Then there is another thing, if you begin at all, you must supply them right along. It don't do to have an over supply this week and run below next. I have shipped butter every week, and nearly the same day in the week, to the same house, for over eight years. Some families have used my butter during all that time. They rely on my sending it regularly, and I rely on their taking it. This condition of things is mutually satisfactory to us. I don't want they should get a taste of any other make of butter for fear I should lose them as customers, therefore mine is there for them every time they want any. The commission man finds the customers for me, and deals with them. He knows how high a price it will do to make them pay, and they pay it. He does the business, and the five per cent. commission pays him for it, and I get as good a net price as I could get in any other way, without any trouble at all, and the money invariably comes the same week the butter is shipped.

QUESTION—How do you ripen your cream?

MR. GOODRICH—It just ripens itself, but if I could tell just how acid it is, I would like to, but that is something I cannot describe. You see it stands in the pan until it begins to ripen, then it is put in a can and kept at sixty degrees. Some of it will be kept forty-eight hours, part of it thirty-six, part twenty-four and part twelve. That is just right and the conditions are the same every time or very nearly the same. In the summer time when it is very warm we set the cream in a reservoir of water sometimes.

QUESTION—Suppose the cream should get thick before you churn?

MR. GOODRICH—It does not get so but what we can churn, but if it did I would thin it with water or warm it up if necessary. Of course cream can be kept too long.

QUESTION—What makes cream foam?

MR. GOODRICH—I believe it is because it is too cold. If it has been frozen it will foam.

QUESTION—Do you use salt in the water you wash the butter with?

MR. GOODRICH—Not usually. My boys salt the butter in the churn but I don't. I take it out and weigh the butter and salt, and salt it on the butter worker. In the churn they have to estimate the amount of salt necessary to put in and cannot get it every time alike.

QUESTION—I looked over a package of butter in the exhibit room that secured the premium this morning under Mr. Goodrich's judgment. I noticed if

one would look carefully there were certain white specks in that butter, slightly mottled. What causes that?

MR. GOODRICH — The salt had not been evenly distributed.

MR. THOM — Would not a little salt in the water you wash your butter with, make the work go easier?

MR. GOODRICH — Yes, that is a good way to wash butter if you are going to pack right from the churn.

MR. HYATT — Could you make as good butter from common native cows as you make from your herd?

MR. GOODRICH — I do not believe there is a man living that can tell by the flavor of the butter what the breed of the cow is.

QUESTION — What do those boxes cost?

MR. GOODRICH — These boxes cost down at Fort Atkinson a dollar a dozen. They are made at Sheboygan Falls.

MR. MARTIN — I wish to say that I think Mr. Goodrich's theory as to setting the cream, the time of ripening, etc., will make better butter than any creamery on earth, and I believe that the private dairy is the place to make money in butter and that there is no industry in the state of Wisconsin that will give you the quick returns that butter making will. Up where I live in the northwestern part of the state dairying has come up since the farm institute was started there five years ago. The banker at our place said to me a few days ago, "George, the dairy interests are helping out St. Croix County."

QUESTION — Do you think it practicable to turn the hand-separator by hand?

MR. GOODRICH — I hardly think, from my present knowledge, that it is practicable, though I know, of course, that it is possible. To do good work a separator must be run at a perfectly uniform rate of speed. *You* might be able to do it, but I am afraid your hired man wouldn't. In less than half an hour he would begin to get tired and the speed would slacken. A one-horse tread-power will run it perfectly and separate as fast as three or four men can milk. Commence milking, get two or three pailfuls and then start the separator. The milk coming right from the cows is at the right temperature; and in ten minutes after the milking is done you have your cream separate and your skim milk perfectly new and sweet to feed.

QUESTION — Why work butter a second time?

MR. GOODRICH — The second working is done after the salt is dissolved. The salt has cut or dissolved some caseous matter and other impurities that were in the butter. These run off with the brine that escapes at the second working, and the result is you have purer, drier, better keeping butter. The operation has taken out not far from five per cent. of the weight, but leaves an article that *suits the consumer* better and he will stay by you. Care should be taken not to work too much. The first time just mix in the salt. The second time just enough to take out the streaks. That will show that the salt is evenly distributed.

QUESTION — What other ways of marketing have you tried?

MR. GOODRICH — I used to ship to different markets — Boston, Philadelphia, New York and other cities — trying to strike the highest market. Then I would change from one commission man to another in Chicago. The result of all this changing was that I did not secure consumers who were looking for and expecting my butter, who could be induced to pay anything above ordinary market rates.

Then, at one time, I worked up a trade with private families in Chicago. I thought that by supplying them — dealing directly with the consumer, I would save some of the profits made by the middle men, and the butter reach the consumer in a fresher, better state. I thought when I had the arrangements made I had just struck the right thing at last. But this proved unsatisfactory and vexatious. They sometimes wanted all and more than I could make, and sometimes I had a surplus left that had to be disposed of some other way. Then there was higgling as to price, etc. But my present method obviates all these vexations and I am satisfied.

## ADDRESS.

### BY COL. PARSONS.

*Mr. President, Ladies and Gentlemen:*

I was sent for and then ordered to come here for the purpose of speaking about the department at Washington, which belongs to you. The department of agriculture at Washington was made because the farmers of this country asked for it, prayed for it and worked for it years before they got it.

They wanted to raise the office of agricultural commissioner up to a cabinet official as a secretary, so that your voices would reach the administration, whatever it might be. You have received this department and you have a right to know something about what it is doing. Now, that department has a main building entirely inadequate. Another poorer one, the seed division, and the third, a wooden shell, under lease, and these are crowded to discomfort. The department has many divisions, each presided over by one expert, in all embracing every feature of land tillage, as well as the diseases of plants and animals. The object is to bring out information and give it to you by bulletins. For instance, Prof. Galloway, chief of the division of plant diseases, has issued bulletins which will give you remedies for the treatment of certain diseases of apple trees, pear trees and grapes, which you can get by writing for them. You know something about the statistical department, sending out bulletins in advance to give you an idea of the markets and to keep you posted as to where crops are heavy or light and the state of the market.

The bureau of animal industry, with which I am connected, deals with the diseases of animals. This department has done grand good work by stamping out the pleuro-pneumonia, and hedging in Texas fever, by quarantine and otherwise, and opening up the markets of the world to American cattle.

The disease that is carrying off thousands and thousands of hogs cannot be handled in the same way, and you should use forceful arguments with your legislature, to get a law which will compel you and everybody else, to bury every hog that dies of hog cholera, to quarantine your premises and thoroughly disinfect them, according to the rule that will be given you from Washington. Then you will

be in co-operation with the national government in this matter and this disease will be checked.

There seems to be a suspicious feeling towards veter nary surgeons, but I tell you they are in demand now; every skilled one is needed to carry on this great work, but he must be learned, and it takes more study than it does to be an M. D.

Now, my friends I have told you briefly of some of the work that is being done by this department. We come and ask you to put yourselves in touch with the department that belongs to you. Your agricultural department in this state as it has been carried on, is an honor to the state, and it stands as a bright star that all the states of this country can look at. Wherever I go, east, west or south, it is known and praised. In Iowa they said they had but one thing against Prof. Henry, and that was, that he would not come to Iowa to live.

I will tell you what the department wants of you. It wants your encouragement, your advice, your co-operation, and it wants you to tell the legislators and congressmen that this department should be sustained by reasonable appropriations, enough to carry out its great work.

# EXHIBITS.

The Wisconsin system of farmers' institutes, in addition to the regular sessions, when short papers and talks by the most successful farmers are given, followed by questions and a general discussion, have invited the exhibit of samples of farm products to be made by the farmers in attendance. At this closing institute a large vacant store near the hall was well filled with exhibits, and the public spirited citizens of Waupaca offered many premiums to encourage competition.

M. T. Allen, chairman of the committee on Exhibits, made the following announcements of premiums:

Potatoes—44 entries.—George Martin, Hudson, Judge.

The Waupaca Starch and Potato Co. offered $10 for the best display of Burbanks, Beauty of Hebron, Early Rose and Peerless.

M. T. Allen, first premium - - $5.00
Henry Dunbar, second premium - 3.00
C. E. Constance, third premium - 2.00

W. C. Baldwin, potato dealer, offered $5.00 for the best half bushel of Burbanks. 23 entries. Jacob Hansen received the premium.

A. M. Penny, potato dealer, offered $5.00 for the best half bushel of any variety. L. Miller received the premium on Beauty of Hebron.

Butter—17 entries.—C. P. Goodrich, Ft. Atkinson, Judge.

J. F. Faulks — First, scored 97 points, - - - - - $5.00
A. Custard — Second, scored 95 points, - - - - - - 4.00
G. R. Lindsey — Third, scored 94 points, - - - - - 3.00

Cheese—J. T. Fleming, Watertown, Judge.

"Spring Hill" factory, M. T. Allen,

proprietor, A. D. Allen, maker, received premium, $3.00, 94 points. "Lind" factory, C. Gibson, proprietor, Mrs. West, maker, received second premium, $2.00, 84 points.

Corn—Geo. McKerrow, Sussex, Judge.

Wm. Brooks received first premium, a copy of the Waupaca Republican and Mrs. Logan's magazine, one year. H. Hanson received second, a copy of the *Orange Judd Farmer* one year.

Oats—Premiums offered by C. E. Holman.

Benny Penny, first, 2 bushels Banner oats; A. L. Rowe, second, 1 bushel Banner oats.

Wheat—Premium of 1 bushel choice winter wheat offered by A. Custard.

S. Rasmus received the premium.

Roberts & Oborn, proprietors Crescent roller mills, offered 1 barrel patent flour for best display of wheat, oats, rye, corn and buckwheat. Hans Larsen received the premium.

Honey—O. C. Harrington received first premium, a copy of *Waupaca Post* and *Ladies' Home Journal*, both for one year. S. Taylor received second, a copy *Chicago Weekly* one year.

Fruit and Miscellaneous—M. A. Thayer, Sparta, Judge.

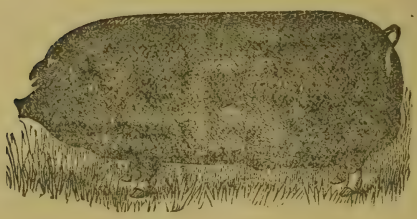
Apples—Mr. Springer received first premium, ½ dozen apple trees, offered by A. D. Barnes. J. C. Green received second, ¼ dozen apple trees, offered by A. D. Barnes.

Vegetables—Wm. Shaw first premium, oil painting 22x36, offered by E. B. Knapp.

Peas and Beans—Jessie Bemis first premium, $1.00, offered by Wm. McIntire. No second offered.

Canned Fruit—Mrs. C. Rogers received first premium, 1 dozen currant sets, offered by A. D. Barnes. E. Townsend second, 1 dozen blackberry sets, offered by A. D. Barnes.

Wool—C. E. Constance received first, $3.50 flannel pattern, offered by J. W. Evans, of Waupaca woolen mills.



# EVENING SESSION—MARCH 19th.

The Institute met at 7:30 p. m.
Geo. Wylie in the chair.
Music—Male Quartette.
Recitation—Miss Jessie Donaldson.

SUPT. MORRISON — We come to the closing session of the most successful institute that we have held in the state, and nearly 400 have been held in the several counties during the past six years, and for fear that a better opportunity may not present I wish to improve the present in thanking the citizens of Waupaca and vicinity for their hospitality and for their active assistance in making this closing institute a complete success. The bulletin that will be issued reporting fully the papers, questions, answers and discussions, will be a publication packed full of the solid meat of practical experience and scientific instruction in reference to every leading topic of the farm. The educational value of these farmers' gatherings is beyond estimate, and our material prosperity as a state and the advancement of the horticultural, dairy and live stock interests is due in no small degree to their inspiring and educating influence. If the farmers of each township could only be induced to organize, to study, read and think how to make their business more remunerative, we would hear less about the depression of agriculture.

CHAIRMAN GEO. WYLIE—It gives me pleasure to introduce you to a graduate of our State University, a farmer, who is proud of his profession; residing and working the farm upon which he was born, in La Fayette county. A badger, proud of Wisconsin and her bountiful resources—Mr. T. J. Van Matre.

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# NOW AND THEN IN FARMING.

By T. J. VAN MATRE. Fayette.

*Ladies and Gentlemen:* I think it very unkind in Supt. Morrison to place an unsophisticated granger like myself upon the programme with H. C. Thom and Prof. Freeman, gentlemen whose literary ability is known and recognized, not only in this state, but throughout the nation. It must have been done to show to you the contrast between the sparkling diamond and the unwrought granite. And occupying this position, I feel much as did Belshazzar at that impious feast when he beheld this ominous hand-writing on the wall: "Mene Tekle Upharson." I feel weak in the knees. However, I am glad to be here to-night, not because I expect to say anything which will instruct this meeting, but on account of the instruction I expect to derive from the gentlemen with whom I am associated. When these institutes were first organized Mr. Morrison wrote

and asked me if I would prepare a paper to be read before the La Fayette county institute, to be held in the city of Darlington.

*Swine Husbandry*

I made reply that I would, and would take for my subject the hog. I had always felt a sympathetic throb for the hog, because he had helped me out of two or three very embarrassing financial difficulties. So when the time came for the institute I came there with my paper and I gave the hog the very best possible send-off. That is, I gave him the best send-off it was possible for me to give him. As the saying is, I painted him red. This was one of the best attended institutes ever held in La Fayette county. There were a great many men and boys there, and quite a few ladies, and for a year after that when I would be passing through the different towns and villages of my county I could see the men and boys pointing and hear them say: "There goes the hog man." Now this didn't sound exactly right, nor to my ears polite. So when Mr. Morrison wrote and asked me this fall if I would prepare a paper for two or three of the local institutes I wrote back that I would, but I would not take for my subject the hog.

*Wisconsin.*

I would take the subject which you see upon the printed programme, "Now and Then in Farming." And I believe, ladies and gentlemen, that I might be permitted to speak with some degree of assurance in regard to farming, because I have watched the rise and progress of agriculture in southern Wisconsin. Fifty years ago my eyes first beheld the light of day upon the same farm which I now own and cultivate. At that time Wisconsin was almost a trackless wilderness, where might be seen the smoke ascending from the Indian wigwam, and the wild fox dug his hole unscared. So you see I am a badger born, and to the manor born. I was born and bred a farmer, and have never had the least inclination to abandon my life work or emigrate to a milder clime. I have seen Wisconsin grow from a territory of less than 20,000 souls to a state of more than a million and a half. I have witnessed the development of her agricultural and mineral resources, until to-day they are second to none in quality and high above the average in quantity. I have seen the primeval forests denuded and the stubborn glebe subdued, until now, as far as the eye can reach in the proper season may be seen cultivated fields groaning under their weight of agricultural products which find a market in the most remote parts of the civilized world. I have seen the patient bovine which was used as a beast of burden to transport the agricultural and mineral products of southern Wisconsin to the great metropolis of the state superseded by the more fleet and agile equine, and he in turn superseded by the iron horse, whose labored breathing and frantic neigh may be heard through the length and breadth of this great commonwealth.

*Education.*

I have seen the educational system developed from its primitive, crude form to the almost perfect system of to-day, which makes it possible for every son and daughter to receive an education which shall fit them for future usefulness. I have seen the old log school-house give way to the more neat and attractive stone and frame buildings, which may be seen at every cross-roads. State normal schools, seminaries, academies, and colleges of

the highest order may be numbered by the hundreds. Benevolent institutions may be met with wherever their presence is required. And here and there all over this land may be seen churches whose spires, pointing heavenward, seem to admonish us to raise our eyes from earth to heaven, that mysterious source from whence cometh every blessing. But in the very shadow of these sanctuaries may be found the licensed grog-shop, placed there by and with the consent of the Christian manhood of this land. I say, shame! shame! I have seen this deadly Upas tree strike its roots deeply into the earth and spread its poisonous branches all over this state, until its baneful effects may be traced to every village and hamlet, and its blighting influences too plainly written upon the countenances of helpless infancy and dependent womanhood.

### *Two Kinds of Farmers.*

You are aware, ladies and gentlemen, that there are two classes of farmers in this country, namely, the yeomanry and the kid-gloved class. The former class may be represented by Mr. Everett, Mr. Convey Mr. Wiley and myself. The latter class might be represented by ex-Gov. Hoard, John L. Mitchell and Prof. Freeman, gentlemen who have grown rich in some other vocation in life, and now follow farming for pastime. And I know how difficult a task it will be for one of the former class to say anything which will entertain or instruct this latter class, and unfortunately for me, a large proportion of this audience seems to be made up of this latter class. An eminent statesman, years ago, taking a prospective view of our American institutions, said "we must educate, we must educate, or short will be our race from the cradle to, the grave." Taking a retrospective view of American agriculture, I say we must educate, we must educate, or short will be our race from the farm over the hill to the poor house. And I do not mean that kind of an education which will enable a man to sit in a comfortable room surrounded by all the luxuries of life and farm upon paper, neither do I mean that kind of an education which will enable a kid-gloved farmer, backed by his inherited thousands, to make farm operations a partial success. But I do mean that kind of an education which will enable the hardy sons of America to buy stock, improve and pay for 160 acres of American soil.

### *Hope in the Farm Institute.*

And the most hopeful signs of an education which I see along this line is the organization of these institutes and the endowment of agricultural colleges by the different state legislatures and placing them under the supervision of such eminent instructors as Prof. Sanborne, of Missouri, and Prof. Henry, of Wisconsin. There are gentlemen present at these meetings who have told you what constitutes a true ration for your stock, there are others who have told you which is the best kind of horse to breed and raise, and still others who have told you how to follow the golden butter tub to success. And I am here, and at the risk of being thought egotistical, will say something to you about our own shortcomings as farmers. And as I said before, my intimate connection with the farm and farm operations for the last fifty years entitles me to speak with some degree of assurance.

### *Distress and Depression.*

All over this land may be heard ascending the cry of distress, not on account of the terrible destruction of the storm,

or the cyclone, not on account of the extended ravages of the parasite, but on account of the general depression in the price of farm products, the consequent hard times and indebtedness of the farmer. Now as farmers it behooves us to inquire into this matter and if the cause can be discovered, apply the remedy. Every cause produces an effect but it is sometimes very difficult to take the effect and trace it back to its legitimate cause. We have hard times, low prices and consequent indebtedness, but it is very difficult to trace back and discover the true cause of this condition of affairs. This gentleman will say it is the result of our protective tariff. That one will say it is on account of the extravagance in governmental expenditures. And a third will affirm it is on account of the trusts, combines and railroad monopolies which infest our land. Now these gentlemen having discovered the cause would apply the remedy. This one says change the national administration. That one would advocate the governmental control of lands and railroads and the single tax system as advocated by Henry George, and a third would say give us an equal distribution of the property. This class, ladies and gentlemen, is a class we want to look out for, they would rob labor of its hard earnings, spend it in riotous living and in ten years call for a re-distribution.

*Largely Our Own Fault.*

Now I belong to a class who believes that the difficulty rests very largely with ourselves and may be traced almost directly to our own stepstones. Go with me if you please, throughout the farming districts of southern Wisconsin, which is only an index to all of the great northwest and mark the extreme appearance of negligence and unthrift which prevades the surroundings. You will see thousands of dollars worth of expensive farm machinery, yet unsettled for, lying in the fence corners exposed to the driving storms and bleaching suns. You will see the fences broken down, the gates off the hinges, the hogs industriously cultivating the door-yard, and the low grade cattle without sufficient food or shelter, leaning up against the fence, trying to muster sufficient strength to utter one faint protest against the inhumanity of man. Enter the home if you can find the way despite the hog-pens, stables, woodpiles and other debris which occupy a prominent position often in the front yard, and listen to the anathamias pronounced against the drudgery of farming by the parents within, who have prejudiced the minds of their children against their life work long before they are able to take up the burdens of life.

*No Love For Their Vocation, Grumblers!*

From force of habit and early education these children become chronic grumblers, and we are raising up generation after generation of grumblers. Hence the truth of the statement. Farmers are as a class, chronic grumblers. Last year we raised an abundant crop and we grumbled because prices were so low. This year we have sustained a partial failure and prices are high and now we grumble because we have nothing to sell. You say this is an overdrawn picture and does not represented the true state of affairs, I say in far too many cases it is literally true and the truth of the statement is borne out by the facts. Now I would advise as a remedy the adoption of better methods, move on or quit. The haphazard,

slipshod methods of a generation ago will not do now. If a farmer does not keep step with the advancing progress of the age, he may as well throw up the sponge. It is useless to sell out and seek some richer soil or more favorable climate because the same methods will produce the same results the world over. And there is much truth in the old saw "The rolling stone gathers no moss."

*Industry Brings Thrift.*

Work, constant and intelligent, is required in every climate and land, and he who lies supinely on his back waiting for a fortune to roll into his hands will enter eternity a pauper. Cultivate habits of greater economy. Stop the leaks and wastes. Competition is more pressing and intelligent than in days past. Remember fine clothes, fine carriages and expensive musical instruments do not help to raise the mortgage off the farm. Breed and keep only the best kinds of stock. For such are always kept at a profit, while poor and low grade stock is kept at an actual loss. Provide warm and clean quarters for your stock, with all of the best food available. Much valuable food is wasted each year by allowing the corn to ripen and bleach in the fields. Prof. Henry estimates 40 per cent. of the value of the corn crop is found in the husks and stock.

We can only succeed by making every thing count and carefully counting every thing. On a farm or elsewhere a man seldom rises higher than his aim. If a farmer gets ahead and wins, it is because he is a business man and directs his farm on business principles.

*Ignorance and Bigotry Beget Failure.*

One great trouble with many farmers is *they think* they know *too much;* they are wiser in their own conceit than seven men who can render a reason. They will not read Prof. Henry's farm bulletins, because they say he is a kid-glove farmer, hence his methods are not practical. They will not attend these institutes, because they say they are run in the interests of a certain political party, and not in the interests of agriculture. Such men are affected with a complication of incurable diseases—ignorance, superstition and bigotry. If you wish to make farmers of your children beautify your home and its surroundings. Place here and there an evergreen or a flower bed; and above all, have a well-kept lawn. There is nothing on earth which will attract the eye or captivate the senses so perfectly as a well-kept lawn interspersed with flowers. If your boy manifests a little more than an ordinary degree of intelligence, don't educate him and put him into some of the professions, but educate him for the farm.

*More Brains and Less Brawn.*

One of the prime needs of agriculture to-day is more brains and and less muscle. A farmer cannot know too much. We hear a great deal said about educated fools, but there is no telling how much greater fools these same men might have been without education. It is not the men with knowledge, but the men who assume to know so much that disgust the world; and the farmer who knows it all is just as great a nuisance as the other fellow who knows it all. But the farmer who reads his agricultural papers, keeps his eyes and ears open, and learns something from every body and every thing with which he comes in contact, is a farmer who will grow and broaden into a wise and wealthy man, making a better neighbor and a better citizen. I claim you

can only judge of a man's ability to farm by visiting his premises and noting his methods. If you find growing this year two blades of grass where but one grew last year, you may very safely conclude the man who has brought about this condition of affairs is a successful farmer. But there is a vast difference between the words and works of men, and it takes some time to become thoroughly acquainted with these tongue-tied gentlemen. I mean gentlemen whose tongues are tied in the middle and both ends flap. I once had a neighbor who could make the best agricultural speech to which you ever listened, but that was all on earth he could make. He couldn't make a living off the best farm in the state of Wisconsin, because I saw him try it for forty years, and he finally became a bankrupt. Let your children see the bright side of farm life, remembering "All work and no play makes Jack a dull boy." Boys early in life manifest a liking for some kind of sport —hunting, fishing, base-ball, or some kindred amusements; guns, dogs, boats and balls should be provided, and time given for their enjoyment.

*All Labor is Honorable.*

Teach your boy that it is just as honorable to haul manure, plow corn or dig potatoes, as it is is to stand behind the counter, measure off calico and ribbons, and with a sickly smile cater to the whims and caprices of the senseless butterflies who come to buy. Teach him it is just as honorable to raise a perfect specimen of the bovine or equine as it is to stand at the bar of justice and plead the cause of some worthless vagabond or soulless corporation. Teach your daughter that it is just as honorable and *much more useful* to know how to milk the cows, feed the pigs and prepare a good, wholesome meal, as it is to know how to play the piano or dance the latest fashionable *glide*. Do not think me indifferent to the accomplishments of life; do not understand me to say it is a woman's place to milk the cows, feed the pigs, or even attend to the kitchen drudgery. But I do say the mother who raises her daughter up in ignorance of these matters makes a grand mistake. Because circumstances in life may render such a knowledge necessary, and the success in future may depend very largely upon such knowledge. If there is a probability that your daughter will become the wife of a farmer, then a thorough knowledge of the details of farm life is absolutely indispensable. And if she should chance to become the wife of a business man, this knowledge will make her no less aimable or attractive. Teach her to be a lady of brains as well as muscle, teach her her rights as an American citizen; teach her to demand the right of the ballot and to use it for the protection of her home and her family, against the arrogant and supercilious demands of the ever increasing rum traffic. Teach her the man who would deny to her this right is unworthy the sacred name of husband.

*Love and Enthusiasm for Your Calling.*

Now I would say to any young man, if you don't like to farm, don't farm, for I never saw a man follow a business he didn't like with any degree of success. But if after mature deliberation you make up your mind to follow farming for a life work, be sure and begin right. "A battle well begun is half won." Select a farm adapted to the particular kind of farming which you propose to follow; and after the selection of a farm the next most important thing pre-supposing you

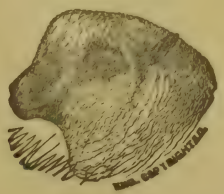
have already selected a wife, is the selection of a site for your building. Choose the most eligible and sightly spot which you can find, and be sure and let it be upon the public highway, the simple fact that your buildings are in sight of the passing public will stimulate in you a desire to beautify your home and its surroundings, which add much to the value and comfort of your home, and enhance the value of all adjoining property as well. Situate your buildings upon an eminence and never in a hollow. Many people suppose it warmer in the hollows than upon the hills. No greater mistake can be made. There is always a cool, damp atmosphere in the hollows which makes it uncomfortable and unhealthful. Protect your buildings on the north and west with a plentiful supply of evergreens which will surprise you with their rapid growth and beautiful appearance.

***Plant Trees and Beautify the Home.***

When I built in 1875, I surrounded my home with Arbor Vitæ, Norway Spruce, Hemlock and American Spruce, many of which are now forty feet high. All of these evergreens named may be pruned in any conceivable shape, so the beauty of your surroundings will depend upon the development of your taste. Don't conclude that your decision to become a farmer also includes a decision to become a careless drone, but rather an active working bee. Make your home and its surroundings a monument to which succeeding generations shall point and exclaim, alas, behold the benefactor of mankind. This idea has obtained for ages, if I have neither sense nor capital with which to enter other fields of industry, I may enter the agricultural field. This mistaken idea has led to many failures. A reasonable amount of good sound judgment and a few hundred dollars of capital is just as essential to success in farming as in any other department of business. And he who enters the agriculcural field relying upon muscle alone, may have his epitaph written with that one single word failure.

***Educate the Farmer.***

The primary object of these institutes is to educate the farmer so he shall have a just appreciation of the importance of the work in which he is engaged. And men who oppose an agricultural education will generally be found opposing a literary edcation; such men are entirely out of sympathy with the advanced American idea, and should be at once relegated to the rear. Now I have farmed during my entire life, and I want to say to you people assembled here to-night, in all candor, I would not change my chosen profession with its pleasant home surroundings for any other business on earth. As farmers, we are entitled to the fat of the land, and if we fail to get it we alone are to blame.



# THE FARMERS' READING.

By FRANK S. GRUBB, Superintendent of Schools.

***How to Make More Money on the Farm!***

Those of you who have been in attendance at this institute during these two days and have listened to the papers and discussions, have noticed that the interest centers on the financial success of the farmers. The questions that have most concerned us were, how to make more money out of our cows; how to produce higher priced horses; and how to get better marketable swine. These are the things that always interest us when we meet at farmers' institutes or gather at farmers' meetings. Nor is it at all unnatural that they should; for whether our farms produce much or little is purely a question of method, and as the conditions are alike in all cases, our conclusions in regard to the best methods for the different kinds of soil can safely be based upon a digested analysis of our combined experiences.

***To Become Intelligent!***

But there are other subjects, with which we all come in contact more or less, that are of quite as much importance as the one we have been discussing. "How to make intelligent men and women of our boys and girls" is a question more troublesome to us than "How to produce salable cows and horses from our calves and colts." Our specific rules in regard to the quantity and quality of food and exercise for our boys and girls are good as far as they go. But they only touch on the physical part of our make-up. They are of no consequence in treating of our moral and intellectual natures. In treating of these, specific rules are entirely out of the question. For a way of doing things that in one family might make the home the center of the universe throughout the period of childhood and youth, and leave a potent influence for good in after years, would be impossible of application in another; or, perchance, if it could be applied, would prove a total failure. Yet there is no doubt but that a few general principles based upon the natural workings of our minds could be laid down, which all might utilize in outlining a course of action.

***As the Twig is Bent the Tree Inclines.***

It can safely be laid down as an acknowledged axiom that our young people are what our homes make them. Just as a well trained and enthusiastic teacher, surrounded by right conditions, insures the success of the school in general and of the scholars in particular, so does a well regulated home to a large degree solve the question we have raised. If we would secure for ourselves the desired results we must look to our homes. It is the home that makes the boy, and it is the parent that makes the home.

While not with the same spirit, yet with as much skill and dexterity as the spider shows in casting his web in such a manner as to retain the fly, must the parent cast an unseen web about the young folks that will continue to bind them to him, be they separated by distances ever so great. This imaginary web contains many threads. Sincerity must be the substance of all of them. Of these threads two are much stronger than are the others. These a wise parent uses to keep the others in place. The

one is the unseen love that the parent bears toward his child, the other is the attractiveness of the home that fondly lingers in our memories. Lack of experience bids me keep silent on the first of these, while a desire to promote our common interests prompts me in enlarging on the second.

For reasons which we can not now stop to question, we were all made intelligent beings with intellects that want to be fed and eyes that want to be pleased. Our love of the beautiful is not satisfied when nothing but rough and barren walls surround our sitting-rooms. And a picture skillfully hung, or a little needle work tastily arranged, invariably serves to make them more home like. But our desire for new knowledge—something to read—is not so easily satisfied.

*Newspapers, Magazins and Books.*

Nothing short of newspapers, magazines and books will here answer our purpose. I do not mean to say that our farms will not produce as much wheat, or that our cattle will require more food without these than with them, but I do mean to say that without them we are neither satisfying the inate desire for learning in our children, nor are we making our homes as attractive for them as we might. I think that we will all admit that books and papers serve us this one purpose for which it is impossible to find any substitute. By furnishing us with strong and healthy food for our minds they become a factor in home attractions that can be obtained in no other way, and if we can succeed in making the home a real home, and keep our children there until they are sufficiently matured to leave it, we can usually succeed in making men and women of them. But some of you, perhaps, think that a well-arranged library for the home necessitates a greater expense than most of you are well able to bear; and you are not wrong in your opinion. A library that would fully supply the wants of an ordinarily intelligent family would cost several hundred dollars, which, with most of you, is no small item.

*A Town Library.*

Owing to this condition of things the legislature of the state enacted a law a few years ago that if carefully executed will make one library serve the entire town for reading purposes, thus giving us the desired reading matter for our homes, and at the same time avoiding the enormous expense of repeating the library for each and every family.

From the time we became a state the government at Madison has assisted us in keeping up our public schools by distributing annually among our school districts the income of the state school fund. To this has lately been added the one-mill tax. This is apportioned among the districts according to the school population, and at present amounts to about $1.40 for each child of school age. The law which passed a few years ago instructs the treasurer of each town to withhold from each school district therein ten cents for every child reported; the same to be invested in suitable books for school and general reading, selected by the town clerk, who may be assisted by the county superintendent. Inasmuch as these libraries are educational institutions, affecting the whole community alike, it is highly proper that the money used in their establishment should be taken from the state fund income. Nor will the annual extraction of ten cents for each child from the several school district treasuries impose any very heavy burden on

our tax payers. For when we come to compare this small amount with the total amount received from the state and county it seems small indeed; we must remember that the $1.40 spoken of is but one-half of the total the treasurer annually receive, the other half being levied by the county board; and what is ten cents out of $2.80 received? Last summer the number of children reported in the different towns averaged about 400. Ten cents for each child would amount to about $40 to be invested in books each year as long as the law is kept in force. Of course this is not much; but we should not expect to build up a large town library in one year.

*A Well Equipped Library.*

The continued with-holding of the money for a few years would give to every town and to every home in the town the full benefits of a well equipped library. Thus in some cases adding and in others strengthening an attraction and influence in the home that is considered the most powerful factor in the proper rearing of children.

The method of selecting the books has already been touched upon. The town treasurer is instructed to with-hold the money from the different school districts and the town clerk, assisted by the county superintendent, selects and purchases the books. In order that the books may be the more appropriate for the intended purpose, the state superintendent has prepared a classified list by which the town clerks may be guided. In selecting the books it should be remembered that there are three classes, namely: reference books, supplementary reading books and books for general circulation, while the first and second of these are of great importance in the school-room, the third, or books for general circulation, will find its way to the farmer's home and thus aid in bringing about the much desired result.

*449 Town Libraries.*

A letter received from the state superintendent states that of a total of 1032 towns and villages in the state, 955 have reported and in 449 of the 955 the law is being complied with. In Waupaca county the law is not faring as well as in other parts of the state. We have 22 towns and village, and, if I am correctly informed in only 6, have any steps been taken to comply with the law. Nor has the law been anything like a failure where it has been applied, for the letter from Mr. Hutchins who has this matter in charge says: "The replies from the teachers and town clerks show that where the town clerks have purchased books adapted to the needs of the scholars, and where the district clerks have placed the books in the schoolhouses during term time, that the books have brought new life and spirit into the district, and the teachers, pupils and parents have all been pleased with the law and have been helped by the books. The remarkable results obtained where there has been proper management prove, beyond doubt, the value of the system as a whole." I trust that the people of this county will consent to give a system that promises so much and at the same time costs so little, a hearty welcome and a fair trial, and, if it proves a success, reap its benefits.

# SHALL WE HAVE PURE FOOD?

By H. C. THOM, Dairy and Food Commissioner.

That we should have pure food goes without saying. There are four reasons why we should have pure food and no reason why we should not have pure food. They are:

1st, protection to the buyer.

2d, protection to the producer.

3d, protection to the manufacturer.

4th, protection to the public health.

A dairyman pays $18 per ton for shorts and middlings. He discovers that the flow of milk decreases and that his herd is losing condition. An investigation follows and the trouble is traced to the miller, who is trying to turn a dishonest penny by mixing an inferior article of mill sweepings with shorts and middlings. There is no hesitation on the part of the dairyman as to what his course is regarding the rascally miller. There is a remedy at law and the miller loses the dairyman's trade for all time.

*Stone for Tobacco.*

There is a stone weighing 60 pounds in a Janesville tobacco warehouse, bearing this label: "This stone cost 10 cents a pound and was bought for Wisconsin leaf."

It was snugly stowed away in the heart of a bundle of tobacco and was delivered by an honest farmer, "who kept the Sabbath day and everything else he could lay his hands on." No one presumes to think that that man escaped the wrath of the tobacco buyer, and it is safe to venture that it will take him a long time to explain the matter satisfactorily to the Lord.

*The Horse Jockey not Alone.*

Mr. Jones says, with the blandest of manner, that his gray mare is sound in limb and wind and is as mild tempered as a lamb in harness, both single and double.

The price is paid and the new owner leads away his prize. The new owner makes no pretensions towards horse lore and his sense does not run in the direction of quadrupeds, but he knows how to get a judgment against Mr. Jones when his friends notify him that his purchase is "trading stock," and has the heaves and thrush, and that Ginger, the mate of Black Beauty, is an angel compared.

So in all matters of barter and exchange, the laws of commerce and trade, supported by the common law, protect the party imposed upon and furnish him a medium of redress. Whatever he buys, whether lightning rod or swamp land, Michigan hedge or promissory note, the seller must establish, in the understanding of the court, that he has rendered value received, in order to restrain the collection, by the buyer, of a sum which represents the fraud. To establish the amount of fraud is more difficult in human food, drink and drug than in any other department of trade. The compounds are more occult and numerous, consequently they require greater skill to pass upon.

*Adulteration.*

To illustrate: One hundred and forty-eight samples of vinegar are upon the

shelves of the commissioner's office. There is nothing in the appearance which would indicate that but 18 of the 148 are made from apples. There are 70 samples of baking powders, 63 of which contain substitutes of lower cost and poorer quality than is essential to a healthful and pure powder. Of the 39 samples of cream of tartar 10 were found pure. Thirty-two samples of syrup are found to conceal 10 glucose substitutes. Allspice contains clove stems, cracker dust, ground shells, charcoal, corn. Pepper contains rice, mustard hull, charcoal, cocoanut shells, beans, bran, corn and ground olive stones.

I have here for the examination of those who are interested, samples of adulterants which are used in pepper, cinnamon and cloves. This stuff is sold by the ton to compounders of spices, who mix with the genuine article such amounts as will enable them to sell at prices to suit the purchaser. I invite the closest scrutiny of these samples, and if any one can discover the slightest trace of the article which they are manufactured to represent, he can have one of Supt. Morrison's reports without pay. What is true of spices is true of all compounds that will admit of sophistication. The list might be extended indefinitely. We work for the few dollars we have, and when we pay it out for things which support and preserve life, we have the right to demand that we are not deceived.

*Vicious Business.*

And yet we are paying out every day $1 for life and strength and getting 75 cents' worth of life and strength in return. For instance: Fifty cents is paid for a pound of baking powder. For this we should receive about one-half pound of cream of tartar, one-fourth pound of soda, and one-fourth pound of corn starch. The chances are that we will receive a mixture of cream of tartar, tartaric acid, alum and acid phosphate of lime. It is the rule, rather than the exception, that plaster of Paris, acid phosphate of lime and sand are found in cream of tartar. It cuts no figure whether an article is intended to sustain life or save it, if an opportunity is presented to compound it, the vicious business goes on the same in bread as in medicine.

*Producer and Consumer Alike Interested.*

How is the producer interested in the question? If beer is best made from hops and barley and some substitute is found that will take the place of both, the farmers of our state have received a sorry blow.

If bottle washings make vinegar, what inducement has Wisconsin to give our horticultural friends $1,000 every year? If cottonseed oil and refuse beef fat make butter, then the dairymen of Wisconsin are $23,500,000 out of pocket every year.

*Chicago Frauds.*

If Chicago compounders can make cheaper butter and cheese than Wisconsin farmers, and can supply the demand, the gentle Jersey can be shipped for a "canner" and the dark-eyed Holstein can be yoked to the plow that she may dream that she can again smell the salt marshes and hear the swish of the Baltic sea.

If 1,000 men can make in Chicago what 600,000 cows can yield in Wisconsin, then the churn can be used for a salt barrel and our cheese factories and creameries may rot and crumble to their foundations. It does not take a vivid imagination to foretell the future if this nefarious traffic goes on without constraint. The farmer who groans under

the burden of a $40 tax upon a quarter section of land, had best be looking for relief, not in the management of state affairs, or the adjustment of the tariff, but in seeing to it that the profit on a pound of butter is not cut in two, because an imitation pound of butter has usurped the market of the genuine product of the cow. The most careful estimates that have been made after years of research, that so 25 per cent. of honest production is displaced by fraudulent sophistication. Make a rapid calculation with me if you please. What is the sum total received by the producers of Wisconsin? How many times would one-fourth of this sum pay all the taxes on all the farms in this state? It is well to have a voice in the affairs of the nation, but many of us have yelled so loudly about taxes that our eyes have closed under the strain, so that unscrupulous manufacturers have charged boldly upon us from behind and carried away hundreds of dollars where we have paid one in tax. That we are mentally blind has made this feat easy. Will we not take kindly to the suggestion that while we may howl never so hard about the $40 tax, it is wise to keep one eye, at least, upon the thief who steals our market. Edison made some great discoveries in the use of electricity. The world has been greatly benefited and the United States has rewarded him by protecting his invention with a patent.

*Public Benefactors.*

Westinghouse made an air brake that has saved the lives of thousands of railroad men, and fathers and mothers have gone to their long home blessing living sons. It is meet that a man of such genius should be rewarded with the approbation and money of the public. A skilled chemist and physician compounds a medicine that proves to be a panacea to suffering humanity, and the "Trade Mark" makes it possible for him to reap personal reward. The manufacturers of human food have no protection. They may invest millions of money in experiments and machineries and factories. They may employ thousands of men in making drugs, and drinks and butter and cheese, and though we are dependent upon them for our very life, we stand idly by and see conscienceless murderers mix up deadly drugs and medicines, compound lime and sand and alum in our daily bread, and pour entrail strippings and cholera hog grease down our throats for butter, which makes our tongues so limber that we can fervently pray to Almighty God to prolong our lives and make us thankful for the humble repast that Providence has so graciously set before us. There is but one other phase to speak about:

*Public Health.*

Protection of the public health. We have the state board of health, the city boards of health, the town boards of health. Then we have the city councils and the town supervisors, men everywhere, skilled and eagle-eyed. They look after the sewers and back yards; they issue orders that dead horses shall be cremated, and that defunct dogs and cats that have gone before shall be laid away. They are active in attending to the contagion of disease. They put red cards on sensative doors that warn all fashionable callers. They burn midnight oil in learning how to take out and repair broken down stomachs, and how to check typhoid fever. They know what is the best thing to do with dyspepsia and how to prolong life under difficulties. These wise physicians know all about the blood circulation and the causes that set the whole business out of joint and

have at hand the best known remedies. They are very patient with us, but we pay them to be patient and they call again at the same price and shade the terms somewhat if we remain long ill. A village of about 1,000 people who eat much of everything without asking what it is made of, requires about four well equipped doctors who know what antidote to prescribe after they have asked the patient "what he has eaten?" In order that over-worked doctors should be relieved, I would suggest an old saw that seems applicable here, about an "ounce of prevention being worth a pound of cure."

*Criminals in Disguise.*

Then too, physicians are laboring under a great disadvantage. A bright little girl belonging to one of the best families is taken suddenly ill. The good old doctor is called and he finds his young friend tossing upon her bed with a bright scarlet flower painted upon either cheek. "Yes I see," he whispers; "I understand the case. I will make you well in a little while." He rapidly writes out a prescription and sends he father to have it filled at once. The directions are on the bottle and the anxious mother sits at the bedside all night so that the tiny drops shall be taken at the minute. The gray morning comes at last, then the sun, then the doctor. His face grows grave when he sees that the flower has deepened its color and has shot out its leaves. "Madam, did you follow the directions?" "Oh, yes sir; very carefully sir. Is Lizzie not better?" "No, I am alarmed that she is not better. I hoped that the medicine I ordered would drive this fever away. Something must be wrong." Yes, something is wrong, cruelly wrong. The scarlet flower grows from day to-day. It spreads out its net work of leaves and branches until their direction is hidden by the soft night dress. The seventh morning comes. The old doctor reverently closes the eyes of his young friend, and the deadly scarlet flower slowly changes to a white rose and a mother's tears silently speak of a great loss. If a man comes into your town and takes the life of a young girl in his hand and flings it into eternity, justice is too tardy to satisfy the cries for retribution. But a cold, level-headed, grasping business man may deliberately mix a potion that looks like a drug that is food for fever, but which, in truth, has been so debased and degraded by inferior ingredients that a life slips away in seven days, and the mercenary compounder escapes without censure, while the good old doctor wonders if his right hand has forgotten its cunning, and the sunshine has gone forever from the home where the flower bloomed and faded.

*Virtue and Honesty Cannot be Legislated into the People.*

To the philosopher it matters little when death comes, so that the end is sudden. But no school of science has taught us to look forward to a daily visit from the grim angel with pleasure, when he looks over his victim deliberately and says: "You are not quite ready; I will call again in the morning." If a choice were offered, we all would take a single large dose and there end it, rather than wait for a hundred small doses to do the same service. There is no gain in ranting about an evil if no remedy is offered. A man cannot be defeated for a political office by howling about him, but some good fellow must be trotted out who can get more votes. No law can be framed to keep the miller from putting sweepings into the middlings, neither can the honest Rock County farmer be made to leave the sixty-pound

stone out of the tobacco; nor the every-day jockey be made to tell the truth. "Virtue cannot be legislated into the people," but the "dear people" can be restrained. Robbery, drunkenness and manslaughter are of frequent occurrence, but who dare say that these crimes are as common as they would be if all penalties were surrendered. That the manufacture and sale of all unwholesome articles of food should be prohibited is clear. That cheap articles of food should be manufactured is equally clear.

*Label Each Package for What It Is.*

Then the only question necessary for us to consider is that of imitations. This is especially delicate because so many men, women and children are trying to make themselves out what they are not. I venture that there are not a few in this assembly who could set up a claim that they did not get what they thought they were getting. That this last proposition is true makes it easy to call upon you to aid me in reform. In many forms of food adulteration the manufacturer goes to considerable trouble and expense to make his article appear like the genuine. In other cases the resemblance is natural. In the former I would suggest that the manufacturer should be restrained by law from imitation; in the latter, that the manufacturer should be compelled to label every package with the per centum of each ingredient. If these simple suggestions are followed the buyer need never complain; the producer can rest assured that his market is not juggled; the manufacturer can figure on honest competition, and if our stomachs break down at the half-mile post we can make no just complaint against anyone but ourselves.

*Dont Look for Immediate Results.*

To unthinking tax payers who want one hundred cents return on a state investment within the year, I will say that a liberal appropriation was made in 1889 to adjust the evils in food adulteration. To these same tax payers I beg to say, that if you invested $7,000 in private business you would consider yourselves very fortunate if your enterprise declared a dividend of seven per cent. at the end of twelve months. Some of the share holders in the Dairy and Food Commission are disgruntled because they do not get 100 per cent. on their investment at once. They forget that millions were put into the Atlantic cable before a single message swept under the sea. They forget that men put their money into real estate in Chicago and died before land took a jump. They forget that France, Germany, England and Sweden have been studying the question of food adulteration for hundreds of years, and that they are perfecting their laws every day. They forget that because the laws are stringent and severe in Continental Europe that it makes the United States the dumping ground for their ostracised manufactures. They forget that they are expecting of the commissioner to do in one year what the same official can do in France when the latter is backed by the laws of 300 years. They forget that our legislature did not know what evils existed, and therefore could not apply law remedies. They forget that trade and commerce is sensitive and that we have fostered large business interests with our approval. These shareholders forget that their demands are out of reason when they require the commissioner to stand on trial and report at the end of one year whether his business is successful or not. What kind of a report do you think the North-

western Railroad Company would have rendered twelve months after organization? If a merchant were told that he must start his business and bring it to a successful issue in one year or shut up his shop, he would never open it.

***Honest Goods.***

Business principles must be applied to state as well as to personal affairs. I do not advocate that rice should not be used in the manufacture of beer, that vinegar should not be distilled, or that cotton seed oil should not be spread upon our bread; but I do insist that rice beer shall not be sold for barley malt, that whisky vinegar shall not rob the orchard of its prestige, that cotton seed oil and tallow shall not pass before the innocent public as butter, the product of the cow.

***Store Made Food.***

These conditions of honesty can never be fairly maintained without a bureau of enforcement. If one will stop to consider the matter he can but see the growing dangers that beset the health and happiness of mankind from the consumption of factory-made victuals. This is pre-eminently the era of ready-made goods. The home-made article is rapidly becoming a thing of the past. This change is noticeable in food products, as well as in other lines. In the larger cities families subsist almost entirely upon factory-made food, even to prepared meats, condensed milk, pies and pastry, jellies and canned goods. Therefore the people are becoming more and more dependent upon the honesty of these purveyors for the quality and healthfulness they take into their stomachs. While it is very important that the public health should be protected, we ought not to lose sight of the importance and necessity of making honest goods at home. A large proportion of our factory products find a foreign market. The reputation of a state is established the same as in individuals, and is, therefore, subject to the same conditions. We can lose in a day what it has taken years to secure. I will call your attention to the article on cheese. Note the following table:

Exports of cheese, showing decline in price and quantity.

| | *Pounds.* | *Per Lb.* |
|---|---|---|
| 1881 | 147,995,614 | 11.0c |
| 1882 | 127,989,782 | 11.0c |
| 1883 | 99,220,467 | 11.2c |
| 1884 | 112,869,575 | 10.3c |
| 1885 | 111,992,990 | 9.3c |
| 1886 | 91,877,235 | 8.3c |
| 1887 | 81,255,994 | 9.3c |
| 1888 | 88,008,458 | 9.9c |
| 1889 | 84,376,053 | 9.3c |
| 1880 | 95,376,053 | 9.0c |

***Wisconsin a Synonym for Value Received.***

It is useless to emphasize these figures. A decrease in our export of cheese from 1881 to 1889 of over $8,000,000 speaks louder than words. You ask what has made it? One circular, issued by the Liverpool exchange last season, to the effect that Wisconsin was exporting cheese filled with stale butter, cost our factories, that then had cheese in England, more than enough to maintain the Farmers' Institutes five years. Not that all the cheese was filled with stale butter, but poor Tray always suffers from bad company. Three counterfeit bills in a community gives a peculiar color to all the bills in circulation. Wisconsin is a proud state. She has a right to be proud. No state is better than ours. Shall we let a few unscrupulous men pull down our reputation? Shall they be allowed to ruin our health and our markets? Can we afford to live a life of constant fear and suspicion? Away with the thought. The day is near at

hand when the word "Wisconsin" shall mean *honesty and straight goods;* and when the merchant prince of Hamburg or the artisan upon the dock at Liverpool shall discover the magic word "Wisconsin" upon his invoice from across the sea, he can say with a sigh of relief and assurance, "I have value received."

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# AN OPEN LETTER TO A FARMER BOY.

By B. H. MEYER, Principal of Port Washington School.

PORT WASHINGTON, Wis., Feb. 26, 1891.

*My Dear Karl:* The very modest request, that I write you once each year, made in your last letter, is one to which I gladly respond at this time.

Your letter contained much of a surprising nature. Uncle Hans' removal to Elmhurst, Erna's return, Hugh's marriage, the sale of a part of the old homestead—all these were so unexpected. And then all the questions you desire me to answer! Those relating to yourself and your brothers I shall attempt to answer in this letter, but the queries of Uncle Hans, as well as the many interrogations of Frida and Edna, must be deferred to some future time, lest this letter shall weary both you and me.

So uncle has left the old farm in charge of Hugh, and his brothers and sisters are to be under his care. May you all be happy together. You miss Uncle Hans and Aunt Stella? Indeed, you must. How kind they have always been to you! Surely, none but they could have occupied so well the two chairs left vacant four years ago.

But enough. I must hasten and answer those questions. For want of a better way I shall take them in the order of your ages, beginning with those you ask about Amos.

### *The Example of Two Noble Lives.*

Amos is the only one of the family who must grow up and go through life without personal recollections of his parents. The inspiration of two noble lives, the soft whispers of a fond mother, the kind words of an affectionate father, these are not, alas, for him to remember. And the noblest way for you to requite for your possession of these is to be to him, so far as you can, what they would have been to him.

Since Amos is now in his seventh year he should enter your district school at the opening of next term. And do nothing in the line of preparing him for school work. No, do not try to anticipate the teacher's work. Do not cram him with the A B C. Let him say the letters of the alphabet neither forward nor backward. Teachers have out grown the idea of sending little tots to their seats after the first day's recitation with the request that they study the first nine letters of the alphabet.

### *Doing Things.*

One thing, however, that you can do; nay, but you should do, is to have Amos continue doing those little things Uncle Hans and Aunt Stella had him do, and which he loved to do so well for their sake. I know that you would willingly

and gladly take those little duties off his shoulders, giving him all his time for himself; but that would be unwise. The little boy who can call a little spot in the garden, his garden; who can feed the hens and say it is his work; who can bring in an armful of wood and say it is his duty; who can regularly and systematically do a score of little things, and do them well; such a boy has learned a lession which will last through life, and by which many a boy of a larger growth might profit.

If Amos continues in such a manner he will enter school with a habit of doing things. He will have learned to deny himself of some things. He will have learned to see some proper relation between will and can, between work and play. And this is vastly more essential than that he be taught the A B C's, for which no teacher cares; or a little 'rithmetic, which will rack his little brain quite enough after he has entered school. This is the best possible preparatory training Amos can have.

*Regularity.*

Then, after he has once begun going to school, he should attend regularly, every day — *evsry day.* In order that a teacher may work to the highest advantage of his pupil, it is absolutely necessary that the pupil be in attendance, daily. An irregular pupil wrongs both himself and his class-mates. He wrongs himself by failing to get what is necessary for him in order to keep up with his class. He wrongs his class-mates by jarring the harmony of the smooth, regular work of regular scholars with the discords of his broken and imperfect recitations. He is thus a double, if not a triple sinner against school ethics.

The best teacher fails to get a thorough hold on a boy who is in school one day and out of school the next day.

I shall never forget the remark Miss Cady made about your early school-mate, Tom Jones. Said she, "Why, Tom was as hard to hold as a greased eel. And after months of toil, after he had learned to do at least a few things for me, after I had gained a fair hold on him"— and now her face saddened and her voice became serious — "after I had accomplished that much, his mother, who not unlike some other mothers who occasionally let their piety run away with their judgment, said, 'My dear little Tom, poor boy, cannot stand the severe strain of school so steadily. He needs a little rest; a little relaxation.' And the lad was sent away for a two week's visit with his aunt in St. Paul. Well, Tom did come back relaxed. The relaxation which his mother thought he needed he got. And got so much of it that he never got together again, after that. All my former grip on the boy, his willingness to do some work, all were completely gone, never to be recovered. And all because of a supposed need of relaxation, which for Tom meant increased deviltry."

*Don't Lose a Day.*

Pupils like your brother Ed., who have attained some degree of maturity may, perhaps, lose a day or two with impunity; for they can work more for themselves, and by extra effort may be able to make up for lost time. But the average pupil needs the stimulus of daily recitations, and the vigor gained by working shoulder to shoulder, with pupils who are his equals or superiors. Generally, each day's task is dependent on the work of the previous day. It is one link to be joined to that part of the chain forged in days gone by. Losing a

day means losing a link; losing a link means a broken chain; a broken chain means being handicapped by those who did attend regularly and whose chain is complete.

Above all things, then, let this impress Hugh with the importance of sending Amos to school regularly, every day.

*Puzzles Will Bring no Mental Growth.*

I have already mentioned Ed. He will probably be disappointed in not receiving answers to his puzzles. Such chaffy material may amuse him, but I doubt whether his teacher, Miss Cole, is taken with them as much as he is. Ed. must remember that Miss Cole's school duties are heavy, and that she can not be expected to spend time in solving "sums" which only an expert mathamatician could be expected to do. It may be all right for old Mr. Goff to work at them, for his great object is to kill time, and puzzles — and such like — serve that purpose admirably. But Miss Cole is an ambitious, hardworking young teacher, and finds a thousand and one very profitable things to do in her few spare moments. She is well qualified to teach in your district, even though she has no ready answers for big Joe's queries, "What is the difference between the number of drops of water in the Atlantic and the Pacific oceans?" "Who is the oldest man living?" "What is the difference between the magnetic north pole and a modern electric car?" "A man bought a hundred animals for one hundred dollars, paying eight dollars for sheep, fifty cents for chickens, and seventy-five cents for turkeys. How many did he buy of each kind?"

To an idle person such things may not be repulsive, but to an earnest young lady, like Miss Cole, they are an abomination. Moreover, the days are past when the ability of a teacher is gauged by her ability to solve the problems with which old Mr. Goff so liberally supplies the big boys. Such tests are relics of bygone days, and I trust Ed. will find more valuable things to question his teacher about.

*Through Equipment.*

You say Ed. will finish the common school course at the close of this year, and that he has decided not to become a farmer. If that is positively settled, he wants to decide upon what he *does* want to become without delay, and then strike out for it at once. Now that Ed. has decided not to be a farmer, he should remain no longer than is absolutely necessary. For him to leave as soon as practicable is much better for Ed. and vastly better for your farm. To remain and work at farming, after he has determined to learn some profession, means to live *away* from his aim; to go north, after he has decided to go south; to dig a ditch, where he has determined to erect a mound. It means cutting off time from the allotted three score years and ten.

*Take the Up Grade.*

Remember, Ed., time is flying fast. Strike out for something definite, and remember that the first requisite of a high shot is a high aim. "Don't join a dying profession. Take one on the up grade. Take one that you will have to hurry to keep up with. Don't choose one that you must needs loiter behind, and hold back, if you stay on speaking terms with it. Select as a life's work something that is of the present and and future; don't nail your flag to a sinking ship." Decide not only on what you want, but also on what you do not want. It is not so much a question of what to learn as what to be willingly

ignorant of. Education has made such great progress that to cover even a small part of the ground is out of the question with the genius, let alone the common clod. There are a thousand different roads to travel over, but to approach the end of one means to be a hero.

"He who seeks one thing, and but one,
May hope to achieve it before life is done,
But he who seeks all things, wherever he goes,
Only reaps from the hopes which around him he sows,
A harvest of barren regrets."

And now, Karl, I have come to that part of my letter which specially belongs to you.

***Bread, Butter, and Business.***

Two years ago you completed the common school course—it's a pity that every farmer's boy doesn't do as much, at least—and you say you will be able to complete the course of the Kingston Graded schools within a year. By all means finish it; you will need it some day. The man of the future needs as much of the three R's as he can possibly get, in order to contend successfully for the three B's—bread, butter, business. Besides, there is something in "doing up a job." That course will give you broader views; it will give you an insight into different subjects, which will be invaluable to you in later years. Few, perhaps none, of your studies will bear directly on farming; but that is not necessary. Those you will get later, when you are in a position to enable you to take advantage of one of the winter courses offered at our University. The branches of the Graded School course will teach you to think. You will learn to use books; you will learn to discriminate between the important and non-important things; you will learn to use your mind. Much of history, geography, grammar, algebra, civics, much of these you may forget before you attain your thirtieth year, but that matters not. Forget it all, every word; your early school training will still be of incalculable value to you. But how can it be of value when it is forgotten? Let me illustrate:

***Acquire a Habit of Study.***

My friend, Dr. March, a man of fifty, left for Northern Wisconsin, one day last fall, to go hunting, and after several days' absence returned with the following, to wit: One porcupine (dead, but not wounded), one cub (quite domesticated), and one deer (which, by the way, had on it the brand of a well-known dealer, and which the good Doctor evidently forgot to take off). All this! the result of several days' hardship. Now, you will not entertain for a moment that the Doctor went for the money there was in the game, for you see there was n't any.

The Doctor knew that every stroll, every jump, every excited chase, meant increased vigor for his muscles, more invigorating air for his lungs, and more rest for his brain. In short the Doctor went, knowing that it would result in gain—gain in physical strength and mental vigor; and that meant gain in the usefulness and effectiveness of his work.

Apply this. Your game, the few valuable things you always will remember, may not be great in quantity or so very fine in quality; but while you are in school getting it you unconsciously gain in strength of mind; without knowing it you acquire a habit of study and application which will last a lifetime. And this habit is what constitutes the inquiring progressive man. This habit forms the men who move the world.

***Hard, Concientious Work.***

The boy who goes through the country

school and does no more is a failure. The boy who goes through a high school and stops there is a failure. The boy who goes through a college and learns nothing after that but better ways of parading his swelled head is a failure. Whoever ceases to grow before he enters the fall of life, is he not a failure? Success in life, in any line, means years of constant, hard, conscientious work. Be it on the farm, be it in business, be it in the professions, success means work; work and toil, toil and work. Therefore, I repeat, Karl, finish that course at all hazards; gain the power it affords, and then you can begin life on the farm intelligently.

The trouble with so many of your farmer friends is not that they did not learn anything in school, not that they cannot learn, but that by leaving school so early, or worse yet, by neglecting school, they did not learn enough to know what learning means. They did not gain the habit I speak of, and consequently they rarely reach and never pass beyond the mediocre. They may become what people call "good fellows," but that is all. They are never to be found among our most progressive and successful farmers.

*Something More than Muscle.*

In this age of progress and sharp competition, to win any reasonable amount of success, means the utmost exertion on part of every fibre in our bodies. It means a summoning of our best efforts, and the closest concentration of all our forces. Notice, I say, all our forces. There was a time when physical power was considered the only qualification requisite for a successful farmer. The man of muscle, he was the man. If he possessed something beyond the mere ability to write his name and read a letter, it was deemed, if not absolutely useless, not much of an advantage. But times have changed.

*The Sickle — Muscle Self-Binder—Intelligence.*

The farmer of ten or twenty years ago stands in the same relation to the farmer of the future that the sickle does to the improved binder; that the backbone of a fish does to a modern scroll saw. The farmer of the future will be—must be—quite as much a man of muscle as the farmer of the past, but he must be more. He must be a man of business tact. He must be an educated man. The farmer who twenty years ago, without both learning and money, squatted on government lands, and made a success of it, if transplanted into the future farmer-world would find the wolf howling at his door. Why? Because he would have to compete with men, not only his peers in physical strength, but vastly his superiors in mental power. While he would hold his own at the plow, he would be completely out-done in the business management of his farm The farmer who puts into his occupation the same tact, the same amount of care and accuracy in details that the average business man does, comes out ahead every time. To use a parody, the farmer must mix the soil not only with fertilizers but also with brains. But you see, Karl, that means better preparation.

*Read Good Literature.*

The many long winter evenings and many an hour on rainy days may be utilized in gathering useful knowledge. Keep some good newspaper. Mind you, I say newspaper. Read it. If then, instead of reading, "The Hunch-back of Hellgate," "Gypsy the Girl Ferret," or others of Tom's favorite books, you read "Downing's Rural Essays" and "David Copperfield" you will certainly not be

much the worse for it. You should also be a subscriber to some good agricultural paper, say the "*Wisconsin Farmer*." You may not be able to do all this at once. It is not necessary, not even desirable that you should. Begin with one. Then add another. Read them. Read them again. Think about them while you are out in the fields. Apply some of the good things you read about on the farm. By pursuing such or a similar course you cannot help but become an intelligent farmer, and did you ever hear of a good, strong, intelligent farmer's failing?

The plea so often heard that a farmer cannot afford these things is rather weak, is it not? Don't you think that the farmer who puts off subscribing for a good paper, or buying a good book until some future time when he fancies he can afford it, will never see that day? Readable editions of our great classics can be bought for from fifty cents to a dollar. A dime will buy, not a dime novel, but well printed editions of our largest and choicest poems. No one need hunger for the most palatable mental food for which princes in by-gone days were only too glad to pay fabulous sums. Really, Karl, in these days when the best books and the choicest literature can be had for little more than a song, I see no excuse for the notable absence of good books and papers in so many of our farmers' homes. In many cases it means but a few cents less for an old hay-rake, a broken wagon, or a two-tined pitchfork at someone's auction. It means but a few cents less for some patent medicine peddler, a "nigger" show, or the man at our fairs with the fortune wheel.

*Report of Experiment Station.*

And while I speak of reading matter, another thing comes to my mind. The Agricultural Experiment station at Madison issues bulletins several times each year, and sends them gratis to all who will go to the trouble of sending in their names and addresses. These bulletins contain detailed accounts of experiments made at the station in the various branches of agriculture, and furnish most profitable and entertaining reading matter.

For instance, while in Madison last summer, Prof. Henry showed me some tomatoes which grew on stout, upright stems, probably more than two feet high, quite unlike anything I had ever seen before. These plants were the result of what is known as cross-fertilization. The flowers of our common, prostrate-stemmed tomatoes had been fertilized with pollen, so-called flower dust of the tree tomato of France; and these nice little tree-tomato plants were the result. But still more startling was the account he gave of some melons which stood in close proximity to the tomatoes. The pollen of African melons had been employed in fertilizing the flowers of our common musk-melons. The first experiment with the melons was made a few years ago, resulting in over-growth of leaves and vines with only a few melons. The seeds of the best of these were planted the following year, and so on until now, and the professor could justly point to them with pride — there was a bed well covered with choice African-American melons. "Wonderful," you say? Indeed, wonderful, but any farm will produce things equally wonderful. Pages upon pages might be written about what I saw in the garden; let alone the dairy, the fields and animals. But why multiply accounts when you may get them in print for the asking? Shouldn't every farmer have enough interest in his calling to study

these things? For a young farmer to grow up and continue in total ignorance of all this great work, is not that base ingratitude to the great state of Wisconsin which so generously provides for it all?

*Farming a Great Science.*

Agriculture is a great study, yet undeveloped. Men like Henry and Babcock have done great service. And even they say, "We have hardly begun." The future will see some heroes in agriculture. And why shouldn't you do some original work, Karl, and contribute something to the science of farming? Investigate and experiment for yourself.

Ah, but that recalls to my mind a sentence in your letter. You complain that Hugh does not care to give up a part of the lot back of the barn for you to try some of the good things learned at the Farmer's Institute.

Plenty of land lying idle under the misnomer of pasture. Acres of land useless for want of a ditch. Strips a rod or more in width stretching across large fields covered by what once was and still is called a rail fence. Here large vacant spaces about barns and sheds; there waste because of an old pile of rails or a half rotten stump, but nothing for an inquiring minded boy to use as he pleases.

*The Farm an Experiment Station.*

I tell you, Karl, what to do; and I warrant that neither Hugh nor any one else will find fault with it. Gather the pieces of wood and stones lying southeast of the house, condense the size of the wood-pile from ten square rods or more to about one-tenth its present area, and use the ground so gained as a little experiment farm. That will be double gain; an improvement in surroundings of your house, and a piece of land of which you are sole controller. Then you can probably get your neighbor's boy to co-operate with you, thus doubling the work. At definite times compare results and act accordingly. Careful experiments, close observation, wise conclusions and intelligent application, these do much towards raising farming to the plane which it is destined to occupy.

Hugh does not believe in such work, does he? Well, you go right on and by-and-by he will notice the difference. "One can't make practical use of what the Farmers' club does." "The Farmers Institute handles subjects which do not help directly on the farm."

"You eat bread, do you not?"

"Yes."

"Butter?"

"Yes."

"Meat?"

"Yes."

"Potatoes?"

"Yes, yes; and lots of other things, such as most people eat."

"But, pray; show me the meat in your bones. Where is the bread in your muscles, the potatoes in your sinews, the butter in your blood?"

"Idiot. How foolish to expect to find the food you eat in —"

"Ah, ah. Please allow a word of explanation. These words should not provoke you, for I am only applying a little of the logic Hugh applies to the Club and Institute. You might as well expect to see the meat you eat in your bones, as to go home from the Club or Institute and literally apply everything on the farm *at once.* Just as the digestive apparatus of our bodies draws nourishment from the food we eat, so should our minds digest and assimulate the various things presented at these meetings. A wide-awake, vigorous mind al

ways finds abundant material for growth among the great variety of goodly things offered at these gatherings. An occasional banquet brings enjoyment for scores of people, but would you condemn the banquet because some sickly individual with a deranged digestive apparatus speaks lightly of it?"

*"Cracker-Barrel" Education.*

Old Mr. Goff used to tell the boys who congregated regularly every evening, on the cracker barrels of his grocery, that about all the president of the Farmers' Club did was to draw his annual salary of two hundred and fifty dollars; that the whole organization was nothing but a fraud, a humbug, and some other words beginning with *st* and *r*.

Now, Karl, I shouldn't advise anyone to waste time trying to convince old Mr. Goff. He has passed the stage of convictions open to reason. He has completely fossilized. But if he should ever again attack you on this question, admit what he says. Admit the Club's being a fraud, a humbug, and a ——! Yes; admit it, but say something more. The Club has given some men—to use Mr. Goff's pet phrase—a chance to catch on to more schemes, and scoop more of what there was in them than scores of others have been able to do. Every member of that club has robbed Mother Earth of loads of plenty that lay hidden in her bosom. Every member of that Club has discovered new avenues by which to reach Nature's treasures. New and better ways of utilizing the gifts of the soil; new and better ways of *living upon the fat* of the land.

*District School Board.*

It was gratifying for me to hear that the many years of excellent service of your father on the School Board of District No. 13, received substantial recognition in the election of Hugh to the directorship; and I hope that he will prove true to his trust, and continue the good work left undone by his father. To be director of a country school is a far more important position than it is often reputed to be. A man of sensible views and good judgment, in that position, has abundant opportunities to apply his metal, especially in resisting the eloquence of such men as Mr. Goff, when he expounds principles of teaching and ways of running a school, standing on tip-toes on a cracker box, behind the counter, and emphasizing every one of his pet arguments with a vigorous descent of his right hand, "For," says old Mr. Goff, "our school is a small one, the pupils are young, and there is no need of looking round much for a teacher. Mostly anybody will do, provided he isn't too steep." Probably you remember, Karl, the rage Mr. Goff was in three years ago, when the school board engaged Mr. Collins in preference to Mr. Bonner; how he talked all day long, and most of the night too, of the fearful extravagance of the board in hiring one young gentleman teacher when another would teach for less. "For," he continued, quite out of breath, and his right hand raised high above his head, "Mr. Collins wants forty-five dollars a month, while Mr. Bonner says he'll keep the school for forty-four dollars eighty-seven and one-half cents, and I tell you," his hand gradually descending to the counter, "it is extravagance, boys; it is extravagance to hire Mr. Collins. It is squandering the people's money."

"Now, is old Mr. Goff quite alone in taking such and similar stands on school questions? Has he not some company? Mr. Collins was a teacher, Mr. Bonner a school-keeper. But aren't there more men, who like Mr. Goff,

would waste — I mean literally waste — forty-four and seven eights dollars by hiring a school-keeper instead of paying forty-five dollars in securing a teacher? In the eyes of Mr. Goff, the difference was twelve and a half cents per month. In the eyes of one who knows a teacher and sees the difference between school-keeping and teaching, the difference was a wise expenditure of forty-five dollars in the one case, and throwing overboard forty-four dollars, eighty-seven and one-half cents in the other. You know uncle Hans used to say, "De letzten fief Dahler hoelt de School uprecht." (the last five dollars teach a school), and wasn't there sound logic in this homely saying of his?

*Preparation for Life's Work.*

And I must refer to Uncle Hans once more in commenting on Mr. Goff's statement that because the pupils are young and few in number anybody will do.

During the many years that Uncle Hans grew trees, not once did he allow you boys to prune them while they were delicate in stem and branch. He well knew that unless the dainty sprout received the tenderest care, and unless the pruning was wisely done, the plantlet could not grow up into a beautiful, well-formed tree. "When you get to be a man," he used to say to Ed, "then you may help caring for them, but until then you must be content in doing such work as I may give you." And how sad he looked one day when Ed., in his eagerness to help uncle, had attempted to prune the young pear trees. "Indeed, Ed., you meant well," he said with a serious voice, "but that is not the question. This is work for men, not boys, and I wish you to wait patiently until you grow up a man. Some of those little pear trees will grow up unsymmetrically and scarred in spite of all that I may do for them in the future. Some of these scars mark the places where, if the trees grow up, they will begin to decay. Those very marks may weaken them in power to withstand the storms of years."

*Easy to Find Fault.*

But again I ask, "Is old Mr. Goff the only one who takes such a view of the question, and is Ed. the only boy who in his kind motives of helping Uncle Hans, takes the pruning knife and attacks the pear trees of the nursery? Ed. was strong enough. He could hold the pruning knife quite as well as Uncle Hans could. But he lacked that maturer judgment which, with the exception of the genius, comes only with maturer years.

The lesson which this teaches is obvious, and a further opposition of it unnecessary. How often do we find a Mr. Goff urging an Ed. to go pruning in the nursery! How often do we find the little babies that should live on milk alone fed on ham and bacon! And how often do we find the propelling force of this very urging to be, as in Mr. Goff's case, a matter of twelve and one-half cents! And once more,— how often is this to be done over again?

"O! let not then unskilful hands attempt
To play the harp whose tones, whose living tones
Are left forever in the strings. Better far
That heaven's slightnings blast his very soul,
And sink it back to Chaos' lowest depths,
Than knowingly, by word or deed, he send
A blight upon the trusting mind of youth."

Mr. Goff's name recalls another incident in the career of that most excellent teacher of your early school days, Miss Cady. After she had recited to me the events connected with Tom's visit to St. Paul, she drew from her pocket a piece of paper, saying, "Here

is another thing the country school teacher has to contend with."

At a glance I found it to be a communication addressed to your father who was at that time school clerk. The note read as follows:

*Uniform Text Books.*

"MR. FREDERICK HANDEL,
Clerk of District No. 13.

*My Dear Sir:*

Although I do not desire to teach your school another year, in the interests of education, for the good of those little ones whose welfare lies so close to my heart, and for the good of my successor, whovever it may be, I submit the following facts to your serious consideration; and with the earnest request that you kindly present them at the next annual meeting, and do what you can to change things for the better.

There were in use in your school, during the last winter, three different arithmetics, four kinds of readers, two kinds of geographies and five different spellers, five parents refused to purchase any book. To add to this confusion and make matters worse, Mr. Brown sent word that unless Sam could study in Robinson's arithmetic he would take him out of school; and unless Sam's sister Kate was allowed to read in McGuffy's Fifth reader, he (Mr. B.—) would come to school and look after matters himself. Mr. Brown's neighbor, Mr. Wilson, claimed there were no geographies equal to Mitchel's, for they were the ones he had when he was a boy, and insisted upon my using them in school. Such and similar cases were a source of constant annoyances and incessant worry to me.

By way of changing the monotony of these dry-as-dust, old-as-Methuselah text books, I gave the pupils frequent general exercises; such as, the study of leaves and common flowers; the study of common insects and birds. To say that my school enjoyed these is saying but little; nevertheless, these exercises can not supplant the regular book work, and a uniform list of text-books is the crying need of your school.

There are many more things which deserve immediate attention; such as, the building of a wood-shed, repairing the fence, etc., but as all these will easily present themselves to an observing eye, I shall refrain from enumerating them.

Very respectfully yours,
HARRIET CADY."

Reading this letter to the meeting, when your father came to that part of it where Miss Cady mentions the general exercises, and the study of flowers and insects, old Mr. Schopmann suddenly interrupted him by exclaiming:

„Dat will ick ju man seggen, dat ick nie wedder Tax bethalen do, wenn eene Lehrerin anstellt werd, de de Jungens wieder nix lehrt als Ameisen in die School to bragen und Sommerrogels to fangen, und damit unnütze Tieb in de School verschwenden dodd."

(This I will tell you, that never again will I pay taxes if you engage a teacher who teaches the boys nothing but to carry ants to school, and to catch butterflies; and in that way waste time in school.)

To which Mr. Goff manifested his hearty approval by planting his feet squarely upon the floor and shouting: "Good, Schoppman; good."

*Guard the Common School.*

The matter of text-books brought on a profound silence, which was broken after a period of coughing and side-glancing, by Mr. Goff, who then addressed the meeting in his usual eloquent manner. It is hardly worth while to repeat what he said. Suffice it to say that his words on this occasion were

quite as hollow and emphatic as those he gave vent to standing on the cracker box; but that there wasn't a man in that meeting who dared get up and urge the recommendations of the letter. However, on their way home from the meeting, men could have been heard accusing one another for submitting so calmly. Yet the fact remained, Mr. Goff's logic had decided the fate of the school, and Miss Cady's successor had to work under the same crippling influences that she had worked under.

Again I ask: "Is Mr. Goff the only individual who is allowed to control a country-school meeting, and determine the fate of a room full of young children? And were those men the only men who have not a word to say at the meeting, but who have plenty of time later to accuse one another for neglecting the school?"

*The True Teacher.*

This letter may have wearied you by this time; nevertheless, I cannot close without saying a word more about Miss Cady. You ask: "What is it that makes me remember her?" It is now eight years since she was my teacher. It is not the arithmetic she has taught me; it is not the geography or spelling lessons she used to hear me recite. What *is* it? The answer to this question may be *felt*, but never can it be expressed in words. Miss Cady was a teacher, a true teacher. There was a *something* about her which affected not only you, but all her school. To give it a name would be sacrilege. It is some nameless, indefinable quality, that unconscious outburst of the innermost soul, which goes forth as the evangel of purity and the inspiration of justice. It is that quality which kindles in us the divine spark, to glow forever. That is what makes you remember her. It is that same quality in our teachers and dearest friends, which challenges us to the good, the noble, the true. It is that same quality that arouses in us those latent powers that develop symmetry, strength and sweetness of character. It is that same quality which mirrors our inward lives, and attracts or repels those with whom we come in contact. And it is this same quality which I would have you hold far above all the other things mentioned in this letter, and have you strive to attain it. Above all, Karl, strive to be, throughout your life, A TRUE COUNTRY GENTLEMAN. Very sincerely yours,

THE WRITER.





# COMMON SENSE IN FARMING.

By A. X. HYATT, Sheboygan Falls.

*He That Is Wise Taketh Counsel.*

*Mr. Chairman, Ladies and Gentlemen:*

Noah Webster did not define common sense. Let me try: One hundred common cents make one dollar. It takes uncommon good common sense to make many dollars farming nowadays. Help with good common sense is scarce and dear, and it takes many common cents to pay them, and more common sense to please them.

The lack of common-*cents* in this world keeps many wretched and ragged. The farmer that has been sitting by the stove the long evenings of the past winter, sleeping, smoking, or whittling, devoid of agr cultural or dairy literature, has not common sense enough to ever know what he has been losing. Whether we sow turnips, feed calves, burn a coal pit, or get up a gentler warmth to forward a tomato plant in a hot bed, common sense is all essential.

*Thought, Kindles Thought.*

A young farmer may have his head full of common sense and his pockets full of them, and yet alone and unassisted he will make slow progress. The farmer that expects to be in the advance line needs something like the startling blasts of the steam whistle to quicken his pulsation. Practical farmers can educate each other, and it is the most common-sensical way to secure knowledge. Light, on doubtful subjects, is what is needed. Any attempt to urge men forward, even in the right path, beyond the measure of their light, is very difficult. Augment their light and they will follow of their own accord. Farmers together, anywhere, discussing questions of farming are learning something, the theory of manure, for instance, the successful application of which lies at the bottom of all good farming; the right way of applying it to the different crops and the different soils, has so many phases that one man is hardly able to understand it all, in all its length and breadth. By being together, the farmers of the county, and discussing the matter fairly and fully, difficulties can be mastered that would be insurmountable to one. The rotation of crops, giving rest to the soil, requires many experiments, and can be proved to be correct soonest by the aid of many. Bring men together in Farm Institutes, Clubs, or even the grocery. Thought kindles thought, and leads to inquiry; one successful farmer, or experiment, leads to imitation and improves the whole people.

*Make the Best.*

The farmer feeds the nation. It is thought that if all the women should leave the world in one generation the men would all go out after them. If all the farmers should leave the earth starvation would stalk the land at best. Assemble the farmers together, then, and impress upon them their importance to this great people. Let them help each other to explore the mysteries of agriculture, each joining in the discussion, and progress must certainly be the result. Theory, in this way, will soonest become knowledge. A thousand bushels of roots can easily be raised on an acre of land if one knows just how to

do it, and they can be fed to milch cows, and gilt-edged butter be made of the milk, as I have often demonstrated to the people of Sheboygan county.

There is a very simple way of having all our cows give 8,000 pounds of *good* milk a year. Buy a Babcock tester and keep none that will not do it.

To make good butter Monday and Tuesday and fail Wednesday is conclusive evidence that you are guessing at something. The dairyman that churns all the evening and his wife the balance of the night on a contrary churning, should seek knowledge. Science is knowledge. The scientific butter-maker is the successful one. It is disgraceful to make any more poor butter in Wisconsin.

My mother was, in her time, a good butter-maker, but I well remember the time when the sheep dog and boys were all tired tramping the tread-power, and the thirty or forty pounds of cream were used for shortening.

I presume her best butter would not be called "gilt-edged" now, in the Chicago market.

***Truth Often Dumb-Mouthed Before Ignorance and Prejudice.***

Were it not for ignorance and prejudice poor butter would soon be banished from among us. We have cases of prejudice yet in Sheboygan county harder to cure than "fits" or rheumatism of the joints. It has always been so. It is now universally admitted that Socrates brought down philosophy from the heavens to the earth, so to speak, yet he was accused of "pratling without end" and condemned to die. Great inventions have been made and forgotton, because men could not be induced to use them. An enlightened Englishman at a fair, suggested that "a piece of plate be presented to Robert Bakewell, for the service rendered his country in improving the English breeds of sheep and cattle." A counter proposition was put forth by an ignorant farmer, that "he was an enemy to his country for trying to change the best breeds of England for a race of *rats*." The last proposition was carried by an overwhelming majority. An attempt to reason with such men is absurd. The only effective way it can be done is with a sled-stake across their backs. Whatever improvement we make tending to increase the quantity, quality or variety of the fruits of the earth is a direct enlargement of the comfort and well-being of our fellow-creatures.

***Agriculture is Heart and Back-Bone.***

Agriculture is the bone and sinew of this wonderful country. A majority of the people rely upon agriculture for their subsistence, and derive from it all the means they have of obtaining culture. Common sense would dictate, if so important, it should be the most perfectly developed branch of human industry. I think it easier to teach one how to construct the most complicated chronometer, to make and operate the magnetic telegraph, than to inculcate the rational culture of the soil, agriculture being the most difficult, and, *certainly*, the most progressive of all the sciences. No state is fully organized until agriculture has received its proper development and its importance fully acknowledged. In agriculture nearly every science could be called into requisition, either directly or indirectly, to mix in with good ordinary common sense, to improve its quality. Some king, I think it was, gave it as his opinion "that whoever could make two ears of corn grow where but one grew before would deserve better of his coun-

try than the whole race of politicians put together."

*"Turnip Townsend."*

This could well have been applied to Lord Townsend of England, who retired from public life in 1730, and devoted the balance of his life to "high farming." He was the "king of turnips" of England, as I am of the United States, and he originated practices that increased the products of his country not only two, but, in many cases, two hundred fold, of which the world is yet receiving benefit. Lord Townsend became so strong an advocate of the turnip that he was often called "Turnip Townsend." It took over a hundred years to establish the turnip crop in England. The farmer would not sow them; or, if he sowed them, he would not hoe them. When common sense gave them the drill, it was scoffed at as "sowing pepper out of a cruet."

Townsend had "sense" enough to see that the root crop could be made the parent of all future crops. Without them much less stock could be kept, much less manure could be made, and therefore much less of everything else could be had. The root crop secured a bare manure heap, and a large manure heap secured a large root crop. Thus "Turnip" Townsend was a national benefactor on a mighty scale, and was the cause of adding countless masses of corn, cattle, mutton and potatoes to the resources of England. When we know that it took 3 or 4 of the brightest lights of England nearly a century to cure the farmers of their prejudice against the turnip, is it any wonder that I am not succeeding better in the United States.

Men and brethren, what are you going to do about it? While the Roman farmer with all his garden-like care, was tormented with a decreasing fertility, England after ages of croping—had arrived, through the agency of the turnip to a point of over fertility.

*Clover, Sheep and Potatoes.*

With sheep and turnips, soils, light and sandy like those around Waupaca may be consolidated, enriched and made very valuable. In England, sheep are penned successively on every part of a field at night, compressing as effectually as any roller, the light blowing sands preparing soil that would scarcely feed a family of rabbits, for luxuriant corn crops. In this way, hundreds of thousands of acres of the boundless sands of England were turned to gardens. With roots, sheep, clover and potatoes, this county could bloom like a rose. Muzzle or kill your dogs, stock up with sheep, sow clover, raise roots and potatoes and become immense. There can be no common sense farming without good plowing. The first requisite is a good plow. There should be two good plows. I do not believe in a "general purpose plow." A strong, well trained team is essential. I keep one yoke of oxen, they are less expensive, and draw a plow with more evenness and force. The furrow slice should be no wider than can be completely turned. Not plowing deep enough is a mistake we most often find in plowing. Stiff, heavy soils, retentive of moisture should never be ploughed in the spring. Clay soils should never be ploughed deep in the spring. Next in importance is manuring. Common sense should teach us that always extracting and never replacing, will in time impoverish the soil. England has been cultivated thousands of years, and yet her soil is richer to-day than ours. Thorough drainage, a proper rotation, good cultivation and generous manuring with barnyard manure, and our soil will

increase steadily in fertility. Common sense is needed all along. The rule of breeding only from the best for dairy cows, holds good in breeding all our domestic animals.

*Select Good Seed.*

Corn, potatoes and our garden seeds and small grains should be from the best that grows. I do not believe it necessary that a choice potato should "run out" in a few years, if common sense was used in selecting seed and planting. Plant whole tubers from the most prolific hills and my experience is that they will steadily improve. A farm should be worked like a garden. Why spade our gardens twenty inches, and plough our land four or five in the fields? Why plant our peas four inches deep in the garden and most of them on top of the ground in our fields? Land well tilled in an unfavorable season will yield more than the same land slovenly tilled in a good season. There are principals underlying all good farming, and these must be mastered if one expects to succeed. God made the earth to produce food in abundance for man and beast, and human skill will turn wastes into gardens. Farmers must compare notes with men of science, and men of science learn the wants of the farmer. Theory and practice will in this way soonest find their true relations. No farmer of common sense will be willing to plod on as 100 years ago, but every new improvement adapted to his wants that will lighten his labor and do his work better, he will adopt at once as so much added to his capital and laboring force of his farm.

*Meet Often and Compare Ways and Methods.*

The farmer should meet often and cultivate social sympathy. The amount I get from my farm depends very little upon the products of my neighbor's farm. That his cows yield abundantly does not a whit lessen my own. Between his success and mine there need be no clashing. All classes should bid the farmer "God speed," from the fact that the products of their labor directly maintain their lives.

Agriculture is the base of all industry, therefore ought be on friendly terms with all and honored for the beneficient relations it holds to mankind. Have the farmers of this country used good common sense for their own protection and well being? It is universally conceded that they have not. Well, why not?

The people that settled this country came from the monarchies of Europe. In those countries the feudal system prevailed which divided the farming population into landlord and tenant. The former, though few in numbers, through the machinery of the government, possessed the wealth and power of the country. No matter what might be the intellect of the latter he must work the farm of another. He belonged to a subordinate class. From this class mostly was this country settled.

The opinion prevailed that they could not govern themselves; therefore some of the needy members of the nobility in their kindness came along over with them, to take care of them and govern them as loyal subject should be governed. Their pay for this service was fixed by the common mother across the sea.

*Is there any Disgrace in Tilling the Earth?*

They brought their laws and religion, their caste and their prejudices. In this country the farmer tilled his own fields, yet he was ranged in the subordinate class. Not only the official, but the lawyer, the clergy, the physician and the commercial man regarded the farmer as not of their set. The farmers led by

young farmer, George Washington, came forth to shed their blood and feed the soldiers, to carry their country through the fierce struggles of the revolution; yet as soon as independence was achieved and a nation established the farmer, by common consent, was kindly permitted to fall back to his former condition. Thus they continued for nearly a hundred years, only as one was wanted for a governor, a cabinet position, or the like.

***"Speak to the Earth and It Shall Teach Thee."***

Is it a disgrace to work or be a farmer? The great Carlyle said: "There is a perennial nobleness, a sacredness in work." No man is so low but there is hope for him if he actually, earnestly works. Progress can only be the reward of labor. Hence labor *is* no curse, but one of the divinest blessings. I embrace all men that work in this great brotherhood.

He who plies the shuttle at Lowell, works steel at Sheffield, stands swart and grim at the fiery forges of Pittsburg, is not one jot the better laborer than a Kane penetrating the Arctic regions, Washington, in midwinter, crossing the Delaware; Milton, with throbbing brain, defending English liberty; Payne, writing *his Common Sense*, that made rulers tremble; Tallmage, preaching at Rome or in his tabernacle; Morrison, running the Farmers' Institutes; Fleming, testing some rascal's milk; or, Hyatt, on his bended knees, in the burning sun, pulling the last root out of a Canada thistle patch—these, one and all, belong to the great fraternity of labor. Without work Adam would have tired of Eve and Paradise, and continued to have "raised cain." All growth of character, all true manhood, all noble energy, is the result of work. The true nobility of this country is the untitled nobility of labor.

***"He that Tilleth His Land Shall Have Plenty of Bread."***

Although the earth is a bountiful mother, and can supply all our wants with a liberal hand, we can see that a tax is imposed upon all who would enjoy her bounties. She has formed ores in the earth, fish in the sea, given to seeds their germinating principle, to soils their life-nourishing power, but she has not given us metals wrought into forms for use; she has not given us food, shelter and clothing; she has provided for no drones in her system—they are interlopers, living on the industry of others.

When this government is controlled by the highly civilized farmer an era of high social and moral development will dawn upon us. We will show the world a country where the people are governed by the people, and coming nearer filling the position an "All-wise Being" intended for man than any preceding nation. When this time comes, and come it must, human toil will be more evenly divided, many of the "middlemen" will be pushed to the outside, and ignorance and prejudice lose much of its power. The farmer's mind will be broadened and elevated, and he will realize his importance and assume places of trust and honor that have too often been given to the dead-beat and demagogue.

***"As Ye Sow, so Shall Ye Reap."***

There is no stopping the wave of progress that has set in. From age to age the farmer has worked on, advancing but slowly up the heights of human progress. They are yet only in the middle passage, but they are looking upwards, and we will pray God that these toiling hosts will yet stand up, the peer of kings, and all their rights acknowledged.

Brother farmer, do we fully appreciate our farms, our homes? To acquire

land, men have consented to everything, even to the seeing of their native land no more. They have bid adieu to aged parents, loved wives and babes, and emigrated—gone great distances—with the hope of some time owning land—a home.

The little Savoyard boy became a slave for ten years, that he might buy a little ryefield and a scanty pasture on the mountain. A slave for ten years!! No matter. For a few feet of vineyard the Burgundian woman has taken her bosom from her own child's mouth and put a stranger's infant to it, weaning her own before time. Thou mayest live, mayest die, my son, sayest the father; but if thou livest thou wilt have land, thou wilt not be a hireling—taken to-day, discharged to-morrow.

*The Pioneer Farmers.*

There are grave and gray men here to-day, who have been soldiers — the pioneer farmers. The great things that have been done by them to acquire land in Wisconsin would read like a romance; but they went to the charge and would not retreat. It was a battle of Austerlitz with them; there was no retreating. To such men the farmer of to-day owes his rugged individuality, his robust self-reliance, his strong manhood.

From such fathers have sprung our greatest jurists and statesmen; men whose wisdom is the glory of the American people, the pride of American agriculture, and as enduring as the Constitution and Union, to which they devoted their *mighty power.*

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# PUBLIC HIGHWAYS.

By S. L. MARSTON, M. D., Hartford, Wis.

The great problem that economists have been endeavoring for centuries to solve, is that of providing facilities for transportation with the least possible delay, waste or expense, for the various articles of commerce, from the producer to the consumer; and no part of a community can be more interested in the solution of this problem than the cultivators of the soil.

*Quick Transit.*

When we consider the facilities for quick and economical transportation furnished by railroads and steam ships to almost every part of the world, we are inclined to look upon the problem as solved, at least so far as our own country is concerned; for as a result of the energy of commercial activity, the whistle of the locomotive can be heard crossing and recrossing almost every county in the United States, taking from every town and hamlet their surplus products and rapidly distributing them in the markets of the world. The producer in most localities may well be content with the facilities for transportation afforded by railroads; but the great expense incurred in their construction and operation, together with the short time required for the complete removal of the products of a large section of country, make it impracticable that they run on parallel lines in very close proximity to each other; so that in transporting the products of the farm to market, there is

another factor to be taken into consideration, and that is, the common wagon roads of the country, and I cannot better illustrate the importance of this factor than by reading to you a brief statement from a Chicago paper in regard to the condition of the roads throughout the northwestern states during the present winter:

*The Country Roads.*

"The bad country roads never were a more impressive object lesson to state legislators than the present winter. Throughout the entire west the majority of country roads, as well as of leading county roads, have been so nearly impassible as to block almost every avenue of business. Nothing is so much needed for the comfort and prosperity of the west as good country roads. The cities suffer from it almost as much as the rural districts. The *Inter Ocean* feels the pulse of a dozen states, and every day comes the cry, "We can haul nothing to market this winter," and the country merchant says, 'We can not sell nor can we collect until the product of the farms can be moved.' The legislatures of western states should give special attention to practical work for the betterment of country roads. People cannot go on making sacrifices every open winter, and mud-bound farmers will grow discouraged." *Daily Inter Ocean, Feb.* 26, 1890.

It is in these country roads that you have constructed, and for the conditions of which, at all seasons of the year, you are regarded by many as being in a measure responsible, that you as farmers have the greatest personal interest. It is upon these roads that you frequently injure your draft animals, meet with other accidents, and waste time in your efforts to convey the products of the farm to market; but as these roads are the arteries through which the life blood from the great producing heart of the country flows to enrich the veins of commerce, all that relates to them is of immense importance to every one whether he be a cultivator of the soil, merchant, professional man or artisian; or whether he resides on the farm, in the country village or metropolitan city.

*Good Roads Promote Intelligence.*

The business activity and prosperity of commercial and manufacturing communities is closely related to the condition of the rural highways. When the roads are good, business is active—when they are bad, the reverse is true; and it is to these common country roads, their history, present condition and future prospects that I respectfully invite your attention. In doing this, I do not propose to confine the discussion simply to the financial aspect of the subject, for the roads of a country have much to do with the social development and culture of the people. Good public roads promote and facilitate human intercourse; and it is from that interaction of man on man, that comes the largest elements of that condition which we term civilization.

The countries of Europe that have made the greatest advancement in road building are, France, England and Switzerland. In France, the work was pressed forward with remarkable energy during the reign of the First Napoleon. It may be said of him that he was the first great modern road builder. His keen economic and military sense saw the advantage that would accrue to a people and nation from well constructed highways. He not only recognized their importance in war but perceived their relation to the development of a high civilization. Other European countries soon followed the example of France, but as a result of the local government that enters in the largest measure into the scheme of their communities, Eng

land and Switzerland far outstripped them all. It may be truthfully said of these three countries, France, England and Switzerland, when comparing their carriage ways with those of our own and other countries, that in them only does life have what may be called a free circulation.

*160,000 Miles of Railway.*

There are no people of any country of equal culture who have paid so little attention to the building of carriage ways as those of our own. We have built canals and one hundred and sixty thousand miles of railroads; we have improved rivers and harbors, and done many other things in the interest of commerce, but thus far we have not devised and put into practice any efficient method of building public highways. It is true that we have carriage ways; roads upon which we have toiled and wasted our substance for years, but they are as yet very imperfect ways.

I will briefly refer to some of the circumstances attending their development.

For more than a century after the first settlement of this country, the communities consisted of small, compact bodies of people, located mostly on the sea coast, or not far back into the interior of the states bordering on the Atlantic.

*Westward Ho!*

Then came the rapid westward extension of the population to the rich and far more inviting lands for cultivation west of the Alleghenies; and as many of you are numbered among those who, forty or fifty years ago, came to the then far west to make for yourselves new homes, you can, from personal knowledge, bear witness that the trials and difficulties incident to the settling of a new country, were so great that but little time could be devoted to road-making; that for years you were compelled to be content with such roads as the soil in its natural condition afforded, after temporarily bridging streams that were unfordable, and corduroying the swamps and marshes through which they were laid; but with an indomitable energy and a soil that produced abundantly, together with numerous cheap draught animals, you were enabled by taking the advantages of certain seasons of the year, to overcome the difficulties these imperfect roads presented to the carrying of the products of your farms to market and to accumulate wealth, notwithstanding the great tax they laid upon your industries.

The early settlers, in their migration from the Atlantic states to the country west of them, took with them to their new homes and into their social lives, the traditions, customs and forms of local government of the states in which they were bred. The communities of the New England states have always made and maintained at the expense of the people, free public highways, while Virginia, from her first settlement, has willingly placed her roads under private control, so that those emigrating from the old Virginia group of states bordering on the Atlantic to the country west of them, looked kindly upon the toll gate, and readily permitted their roads to be built by corporations, who acquired by their construction the perpetual right to embarrass the commerce of the country by a tax laid upon every vehicle that uses their improvement.

*Toll Roads.*

At this time the principal roads of the southern states are toll roads. On these roads the ordinary rate of toll for a vehicle that can carry a load of two tons

is about five cents per mile, or about ten cents a bushel on wheat which is transported a distance of ten miles. It has been estimated that the people of one of these toll-gate states (Kentucky), are taxed annually by these roads not less than a million dollars, an amount nearly or quite equal to the entire revenue of that commonwealth.

The burden of this toll gate taxation falls heavily upon the poor and is not without weight upon the richer part of the population. The roads are generally owned by local capitalists. Their profits go in to but few pockets, and the revenues from the investments, often relatively very great, are mostly returned to commercial people—bankers and other small capitalists who dwell in the towns. Certainly, roads so taxing the people should be good roads, roads over which heavy loads could be transported at all seasons of the year; but that such is not always the case with the toll roads of the south, is shown by the statement of a gentleman who has recently traveled over that once much used toll road from Central Kentucky to Cumberland Gap, and thence southerly to Virginia. He says that: "The roadway has been in good part destroyed by frost and flood, yet I was compelled to pay a toll of several cents a mile for passing over it, though it was necessary to take a pickax and spade in the wagon, in order to render some parts of the road passable by wheels. At times this road is blocked even to horsemen."

### *Retard Civilization.*

It is not alone on account of the burden that toll roads impose upon the industry of the people that they are objectionable; a greater evil is their effect in limiting human intercourse to that required for the necessary commercial transactions; and I am disposed to attribute in good part the retardation in the economic development which is visible in those regions, where transportation is thus burdened, to the effect of this incumbrance.

In the toll-gate districts of our country, the people have a momentous economical problem before them; the vested rights in the toll roads are, in most cases, yearly becoming more profitable to the individual holders and a heavier burden upon the people.

Charters should not be granted for the construction of toll roads, and those that are in existence should be discontinued as such by the exercise of that right of eminent domain which is fortunately retained in the organic laws of our states.

Throughout the New England States there is scarcely a single toll road, except it be where, as in the White Mountains, ways have been constructed for pleasure traveling alone; and, as I have before stated, it is a tradition of those states that the roads shall be constructed "by the people and for the people."

### *New England Stock.*

It is exceedingly fortunate for us that the first settlers of the northwest came from nearer Plymouth Rock than Virginia; that they were the descendants of men who once made Boston harbor a great tea receptacle rather than submit to unjust taxation; and that they foresaw in the toll-gate system of roads a perpetual taxation without representation for themselves and their posterity. The first settlers and founders of these Northwestern states were men that would not tolerate that interference with their personal rights and liberties that would result from having the roads

between their homes and their market places owned by corporations. Rather than submit to this, they would be content with the free ways they had marked out, even though they were compelled to travel them unimproved as they were; at times, through mud knee deep.

The limited means and the immediate necessities of a people settling a new country require that they economize their time and money, hence the statutes for the maintenance of public highways throughout the northern and western states were not so framed as to permit of the immediate building of roads. It was believed, however, that they would ultimately accomplish that work. That they have failed in this, I will show later on.

***Straighten and Improve the Highways.***

Under these statutes the alignment of the roads, as we at this time find them, have been made, and in some localities it is very satisfactory; the roads centering, as they do, in nearly direct lines from the different points of the compass toward the railroad stations, and in reasonably close proximity to each other; but in other localities, especially where there has been manifested an unyielding disposition to make the roads follow section and quarter lines regardless of the topography of the country, and the increase of distance to be traveled to the station in order to preserve the square or oblong contour of farms, there is much room for improvement. In many places crooked roads should be made straight, while in other localities, where they pass over sharp hills or soil unsuitable for their construction, they should not be permitted to remain straight when a little divergence from a straight line would remedy the difficulty. The rights of the individual are secondary to the rights of the public, but private property cannot be taken for public use without a just and equitable compensation.

The statutes framed for the maintenance of public roads in the west, with the exception of our state, Indiana (where the road taxes are paid to the state in cash or its equivelant, good and faithful labor), are the statutes with but little change that are in force to-day. They provided that the roads of a town be subdivided into roads districts, and the taxes be levied to maintain the roads of each district upon the property of the district, to be paid in labor on the roads of the district in which they were levied, under the direction of an officer, to be chosen annually from among the residents and tax-payers of each district, to be known as the overseer of highways, Statutory provisions have also been made permitting appropriations of money from the town treasury to certain districts in which the taxes levied for road purposes are not sufficient to make and maintain passible public highways.

***Present Laws Impracticable.***

Taking a brief retrospective view of these statutes, we will first notice the impracticability of making an equal taxation or distribution of labor as a consequent of the arbitrary division of the roads of the town into districts, and the requiring of the working of the road taxes in the districts where they are levied.

In districts whose topography is favorable for road making, the most valuable farms are to be found upon which to assess road taxes; but the amount of labor required to keep the roads in repair in such districts is much less than in districts that may be, and not infrequently are, situated between them and their market place; districts where the

roads pass through swamps and marshes, or over hill land in which the farms must necessarily be far less valuable and less profitable than in the more favored locality, that is, relatively free from swamps, marshes and hills; so that the residents of districts in which the roads require much labor to maintain them in passible condition, and who are the least able to devote time to road work, have vastly more labor to perform than their more fortunate neighbors who are equally benefitted by the improvements that may be made. The same inequality that exists between districts, exists in a larger sense between towns.

It is true that provisions have been made for the appropriation of money from the town treasury for the accomplishment of work in districts where a sufficiently large road tax cannot be levied to make and maintain passible highways, but the rule has been that such appropriations have not been sufficiently numerous to attract much attention, except it be in instances where large streams have been bridged at the expense of the town. Frequently, the improvements that should be made, and for the making of which, districts require help from the town treasury, are so located that a majority of the people of a town feel that they have no personal interest in them, and decline to vote a sufficient amount of money to accomplish the work. Under these circumstances the burdened district must continue to toil on in its own interest and in the interest of the people of other towns, and if not in the immediate interest of the whole, in that of a large majority of the people of the town of which their district is a part. In the meantime, all whose immediate interest demand that the roads should be made and maintained in a passable condition, are compelled to take long and circuitous routes in carrying their products to market.

### *Highway Commissioners.*

In these statutes it is provided that the districts should not only furnish the labor for improving the roads, but that they should also furnish road masters or overseers of highways, under whose direction the labor is to be performed. There has been no difficulty in complying with the first requirement of the law. Men who can perform labor are quickly forth-coming when legally called upon to do road work, but to find the man within the bounds of a district who possesses that scientific and practical knowledge of road making that is requisite in order to skillfully, economically and properly direct labor, and qualify him for the responsible office of overseer of highways, is in most districts an insurmountable difficulty, so great indeed, that considerations of this kind have had but little bearing in the selection of this officer. It has been taken for granted that the presumption of the law that any resident of a road district who may be elected at any annual town meeting, to the office of overeeer of highways, is fully competent and every way qualified to discharge the duties of that office, so that we find that there are but few individuals who have been continuous residents of districts for twenty years or less, who have not been overseers of highways. It seems to have been a custom to let the office go around until every resident of the district has had the doubtful honor of trying to fill it, so there are but few districts who have not had twenty or thirty or even forty different overseers during as many years; and it frequently happens that the most competent man in the district

is displaced by one that is incompetent and good work that is done one year is undone the next.

Under these statutes our highways have reached their present stage of development. Notwithstanding their imperfections, something has been accomplished. In localities where people have contented themselves with providing for the drainage of the soil over which the road is laid, with hauling gravel upon the road bed, and reducing the sharp declivities of hills together with removing stone, both large and small, from the road track, perhaps all has been done that could have been done under the law; but as a general rule in most of the road districts of our state, the common roads are constructed and maintained in the most ignoront and inefficient manner.

### *The Present System a Farce.*

In no other phase of public duties does the American citizen appear to such disadvantage as in the construction of roads. He in unwilling to admit that the impost upon his labor for road maintenance is a tariff and not a tax; he rather regards it as direct taxation, and this he has a great indispositisn to endure, and hence works on the road grudgingly. He knows that with the improvement of the highways, the value of his farm property is relatively increased, but his ambition to accumulate wealth does not lead him in that direction. He has not the time to spare for road work. This, together with his indisposition to acquire the necessary engineering skill, greatly disqualifies him as a road maker.

Cicero tells us that "it is the first and fundamental law of history that it should neither dare to say anything that is false, or fear to say anything that is true, nor give any just suspicion of favor or disaffection."

Bearing in mind this teaching of the great orator, let us look into the horoscope of the past and take a cursory glance of ourselves as we appeared from year to year in the capacity of road makers, even though we have to admit with the imigrant from Erin's green Isle, that,

> "I was niver much given to road work,
> It wasn't a gift of the Bradeys."

### *Working (?) on the Road.*

At an appointed time, generally in the month of June of each year, the voting population of the several road districts assemble on the highways with teams, ploughs, scrapers, hoes, spades, shovels, etc., at places designated by the overseers, to work out the annual road tax, and ostensibly for the purpose of repairing and improving the roads. Arriving on the ground, generally a half hour late, they proceed to discuss the general subject of road making and other matters of public concern until some one with a troubled conscience looks at his watch and admonishes them that time (which they all remember is the equivalent of money) is flying. They are then divided into squads and distributed along the highway, and as the overseer is not omnipresent, commonly some elder of each squad is by common consent absolved from labor and made superintendent of operations. They then with much deliberation, commence to take the loose soil and mud from the road side ditches, if it so happens that the way has been ditched at all, and with it fill up the ruts and plaster the surplus upon the center of the road. Teams, ploughs and scrapers are brought into requisition, and the soil whether it be loose and porous, or clay, is scraped or hauled on wagons into the cradle holes or sloughs,

and into the center of the road in a general way. Sometimes brush is cut and laid upon the road in places previous to scraping on the clay or loose soil, all of which gives very frail support to the wheels of loaded wagons. In some localities at times gravel has been placed upon the loose soil of the road bed. This is commendable, but the successor of the overseer who may direct this, may subsequently, perhaps the next year, cause the whole to be covered with clay a foot deep.

Mr. Robert Fargo, of Lake Mills, in a paper read before the farmers institute held in that place, made this statement: "Not a mile from this hall not long since, the overseer covered a good gravel road with clay from either side, making it, later on, impassable for a load, and the public were forced to take another road into town." This is not a solitary case. Such work is not uncommon, and it is an illustration of the fact that good roads do not come by chance, but are to be intelligently constructed upon correct scientific principles.

### *They Make the Roads Impassable, and Should be Fined.*

In some localities, where the soil is sandy, it is not infrequent for these road-makers to plough on either side and, with the scraper, round up the road track, thus preventing the conservation of moisture by destroying the best part of the road, that which is partly grass and bush grown, and making the road almost impassable in times of drought. Whatever tends to hasten the drying of sand should be avoided as much as extreme wetness in the case of clay. Two or three days or more, having been devoted to this kind of work (at a season of the year when labor upon the farm is almost invaluable) and the road tax having been worked out, each man having been credited at the rate of one dollar an fifty cents for each day's work of eight hours, and those who furnish teams and tools having been credited at the rate of one dollar and fifty cents for each team, fifty cents for each wagon, and twenty cents for each plough and scraper, the roads are said to have been repaired and put in such a condition that no further repairing will be necessary for a year. But not being quite content with their work, and not fully recognizing the fact that the whole four rods width of the road are for the uses and benefits of the traveling public, they proceed to trespass upon rights and privileges by placing obstacles to travel, such as stone, small logs, rails, brush, etc., upon each side of the road track, so as to compel the intelligent and humane traveler—who, for his own comfort and the ease and comfort of his horses, would find his way along the road side—to travel upon the heavy, tiresome and uncomfortable track they have made for him. A greater objection to these obstructions to the free use of the public highways, is that they are sources of danger, especially in the night, and serve no useful purpose. And now the overseer, who, apparently had not learned the first lesson of roadmaking, together with the time-serving crowd, whose chief desire seems to have been to get the road tax out of the way, leave the highways, but unfortunately to return again at the end of twelve months.

### *Millions of Dollars Wasted.*

I say unfortunately, and I speak advisedly, for not less than ten million dollars have been worse than wasted in the state of Wisconsin within the last twenty years in hauling into the roads mud or the material to make it.

I know you are asking: "What is the remedy?" We will consider that later on; but now having given a description as to how the roads have been repaired, I will say a few words in regard to the condition in which they are left. In doing this, it is only necessary to refer in a general way to your own experience and that of the traveling public. You, as farmers, having full knowledge of the time when the road repairing is to be undertaken, generally arrange to have all the hauling that it may be necessary to do on the roads done prior to the annual road picnics, for you have learned that it is not until the summer and fall rains have in a measure undone the work, by washing the mud and loose soil from the track, or rather until nature has by a process of reconstruction remedied the damage done, that you can with ease transport any reasonable load to or from the market place. The experienced traveler, if possible, always avoids these freshly repaired roads. He prefers to take a circuitous route, even though the distance be greatly increased.

We have no reliable data upon which to estimate the cost to the public, arising from our present ineffective road ways, but if we include with the waste of time and money expended in road repairing, which amounts to at least one-half of the road tax assessed each year, the loss of time and transportation power of vehicles, the wear and tear of wagons and carriages and the beasts which draw them, it is not improbable that the expenditure will be found to be greater than the amount that is annually required to pay all the taxes assessed against you. It will not average less than twenty dollars per annum to each farmer.

*After 40 Years' Patient (?) Work.*

For more than forty years the people of the state of Wisconsin have continued to annually work out their road taxes, as required by law. During that time they have expended in this work vast sums in time and money. There are but few towns in the more thickly settled part of the state that are not assessed annually two thousand five hundred dollars road taxes; these taxes represent so much solid cash, and that better results have not been obtained by its expenditure for so many successive years, is due in a great measure to the fact, that under our system of management a sufficient number of men possessing technical skill and special knowledge of road-making, have not been placed in charge of the work.

The numerous matters that demand consideration by overseers and all engaged in road construction, are of such extremely varied nature, that I cannot discuss them at length at this time. I can only indicate in a general way some of the factors in the problem to be solved, but before doing this, I will direct your attention to what constitutes a good carriage way. I do not mean how such a way is to be constructed, but rather what are its external appearances, when constructed, and what its capabilities of endurance. First, it should be level; and, second, it should present a wheel and foot bed that is lasting, that cannot be disturbed in any climate at any season of the year by the oscillating motion of the wheels of heavy vehicles, or by the iron shod hoofs of the domestic draught animals that are used to transport heavy loads.

*Let Us Have Trained Men—Skillful Engineers.*

It is true that you cannot build perfect roads being handicapped in every effort in that direction by laws that are framed for road repairing and not for

road building; yet you can in a measure, imitate their essential features, and in order to do this, careful consideration should be given to three important factors of the problem of road construction, together with a careful study of all the multiplies of these factors. You should consider first, the character of the surface over which the roadway is projected, which includes not only the nature of declivities but the character and variable constitution of the soil and sub-soil; second, the form and action of the vehicles that are used in transporting loads, and third, the work done through the feet of draught animals. The deductions that you will make from a careful study of these basic facts will not permit of the disturbing of a hardened road track in which the roots of all vegetation have been destroyed and the soil, by long use, has become impacted to such a degree that it is in a measure impervious to water by ploughing or otherwise, but will require that in the repairing of such a road track, or in the bringing it up to a proper level that suitable material (not loose soil from the road side) but gravel or something better if possible be used. If gravel is used, it should be of a somewhat limey nature, for in this kind of gravel, a natural process of cementation goes on whereby the mass becomes very firm.

In dealing with clay roads, either on high or low ground, you will appreciate the necessity of deep ditches each side of a road track, which should be of no more width than is imperatively necessary for the uses of the structure. From these ditches others should be cut in such a way as to keep the side ditches constantly drained to the bottom. The ditches should extend to a depth which will maintain the crown of the road two feet above the water level.

*Good Drainage Necessary.*

It is only by effective drainage that clay roads can be made into passable ways at wet seasons of the year. The grains of which clay is composed are so fine that they hold considerable water between them by capilary attraction; the contained water expanding when it freezes, pushes the particles asunder and destroys all the adhesion which tended to grow up between them; the result is that in the spring of the year, its loose texture, the spaces for the storage of water having been increased by the expansion of the ice, it is incapable of bearing up the wheels of a vehicle, and the clay when cut by the edges of the wheels, quickly slips around and grasps the spokes and felloes, and creates so great a resistance that it is very difficult for a strong team to draw for any considerable distance an empty wagon over the road.

Upon clay roads, even though they be well drained, an artificial surface should be constructed. To accomplish this with timber or stone is expensive and you will resort to the mingling of some cheap binding material with the clay to prevent that slipping of its particles which would result from the sheering strain of wheels. To accomplish this end, various materials have been used; the cheapest and least serviceable is the repeated covering of the road bed with shrubby vegetable matter, the finest branches of trees, the leaves of pine and even rushes have been used to advantage. In northern Minnesota, a material is used called excelsior, which is strip-like shavings cut by machinery from blocks of wood, and is reported as serving admirably to prevent the motion of the clay, but more permanent and far better results will be obtained by using gravel or shale. Whatever material that may

be used should be commingled with the clay and in the proportion of one-half and extend at least a foot below the surface.

*Sandy Roads.*

If you are the resident of a district in which there are sandy roads, you have found them to be in the best condition during rainy weather, and at seasons of the year when clay roads are almost impassible, and the reverse is true. At seasons of the year when clay roads may be regarded as excellent, sandy roads will be found to be in a very incoherent state. The explanation of this is, that as long as the sandy soil contains a certain quantity of water, the grains, owing to their general irregularity, are held face against face as bits of glass are when their several surfaces have a little water between them. Sand of an angular character is thus pretty well bound together when wet, but when dry the adhesion is destroyed and the particles are free to slip by each other when the wheel presses upon them. It is apparent that the principle object in the maintenance of this class of roads should be the conservation of moisture. There should be but a single track with occasional places for teams to pass. This track may be improved somewhat by the intelligent use of a little clay. The growth of plants and shrubbery should be encouraged along each side and in close proximity to the track. Shade trees that have heavy foliage should be planted on each side of the road; they will not only tend to prevent the evaporation of moisture, but their leaves falling in the road track will be of some utility.

In all your efforts to make a hard and durable road by mixing material with the sand upon the surface, you will probably meet with the same disappointment as the man of old, who built his house upon the sand.

None but skillful engineers with ample means at their control can build perfect roads; fortunately, for them, sandy soil is not an unsurmountable obstacle. Wherever hills may occur in a roadway it will not be erroneous to cut them down, even to the level of the road track on either side, and if they are of a gravelly nature (and the roads are not sandy), to distribute the material along the road bed throughout the district. Where the roads are laid over gravelly soil, you will not trouble yourselves to haul clay or sand to make an artificial surface.

*Our Civilization Demands Better Roads.*

The essential features of such a roadway as the wealth, necessities and culture of the people demand, is that it should be level or of easy grade; that the road bed should be constructed upon a firm foundation and of solid compact and indestructible, material such as gravel and stone; that it should be equally serviceable at all seasons of the year. It is claimed that the building of such a road is very expensive, and that it would burden the people with heavy taxes. In considering this question, the expense of building, their durability should be taken into consideration, and due recognition given to the fact, that when completed but little will be required to keep them in repair, and that in the long run, they will be more economical than our common roads. The expense of constructing such a road has been greatly diminished within the last two decades by the invention of stone crushing machinery. The process of preparing stone by hand-breaking as was formerly practiced, has now become obselute. Blakes' stone crusher, or a

modification of it, moved along the road from place to place and operated by means of a portable engine, does the work with great rapidity and with comparatively little expense. The cost of grading and constructing double track roads, one of stone and the other of gravel, under the direction of skillful road masters throughout the greater part of the state of Wisconsin, will not much exceed two thousand dollars a mile, and as the average number of miles of road in a town is about thirty, the cost would be equal to sixty thousand dollars to each town, which sum if raised on the twenty-three thousand and forty acres of land that constitute a township, would be a pro rata of two dollars one and seven-tenths cents per acre, and as there can be no question but that such an improvement would more than double the cash value of every acre of land in a town, it cannot be regarded otherwise than as a good investment. In order that taxes might not be burdensome, many years should be taken for the accomplishment of the work.

***What Have You to Show For All Your Work?***

A sum equal to the taxes that have been levied from year to year for road purposes would accomplish the object in a reasonable length of time, were it paid in cash and its expenditure intelligently directed.

The amount annually assessed for road purposes will average twenty-five hundred dollars to each town; this would accomplish the work in twenty-four years, and could the amount have been saved that has been wasted during the past twenty-four years in useless road work, it would have accomplished it in forty-eight years and probably in much less time. A sum equal to the amount of the losses sustained annually by the farming communities and all the various business interests of the country in consequence of bad roads, would undoubtedly accomplish the work in considerably less than five years.

Time has demonstrated that road districts and towns cannot check this waste or build such roads; neither can it be done by the weak government of our county system. All the attendant circumstances connected with the building of a vast system of roadways, together with the nature of the work to be accomplished, will require that all existing statutes relating to roads be repealed and laws enacted for road building, and the work placed in charge of the state, which has the power and the means adequate for the purpose.

***Highway Taxes Should be Cash.***

Your road taxes should be paid into the state treasury, and it might be left to your option to pay them in cash, or in obligations to perform good and faithful labor on the highways, under the direction of the state. But you, as farmers, should be relieved in part of the burden of making country roads. Railroads and all other corporations and all that own taxable property in cities should be taxed equally with you for their building and maintenance. The consumer is equally interested with the producer in diminishing the expense of the transportation of products and should aid in accomplishing this result. The churches could not consistently object to a road tax being levied on their properties, for there are but few human agencies that present greater hindrances to a growth in grace and in a knowledge of the truth than bad roads.

***A State Road Commissioner.***

In regulating and directing the ex-

penditure of money for road construction, the state would be controlled by the same business principles that are practiced by corporations in the building of railroads and other extensive works. There should be a state road commissioner; one will be sufficient, for the multiplication of offices complicates the governing machinery and brings confusion and inefficiency. He should be elected every two years and be held responsible to the people for the proper and economical expenditure of their money. There should be a corps of engineers selected by its chief, who should be appointed by the governor and confirmed by the senate. This being done and proper legislation made in regard to the apportionment of road money to different localities, the work of road building, together with the maintenance of roads in a passable condition until the work is completed, should be commenced simultaneously at every railroad station, and such other localities in the state as may be determined by the road commissioner or fixed by law. Revenue from other sources than the direct road tax might be used for carrying on the work. The large sum that is due the state from the general government on account of war taxes could not be better used than for this purpose.

### *Numberless Advantages.*

The carrying on of such a system of public improvement by the state would inure in many ways to the advantage of the communities. The monies that would be collected of them for road taxes would be expended in their midst, and would mostly return almost directly to their pockets for the products of their farms and workshops; work would be given to the unemployed, an impetus to business of all kinds and a general prosperity would result.

The most enlightened people in the world are those of our country; in the arts and sciences, in social and political economy, in civil and religious liberty we lead all others, and as the history of civilization is the history of good roads, I have no hesitation in saying, notwithstanding the wise admonition of Hosea Bigelow to "never prophesy unless you know," that the roads of our country in the near future will be good roads and free to the public; that they will be constructed upon the most approved method of road building, and will as far excel the roads of to-day as do the paved streets of our modern cities.

### *The Age Demands Better Roads.*

This progressive age will not much longer tolerate roads that interfere with the regular transaction of business at any season of the year. The twentieth century, the sun of which is already beginning to dawn in the east, will relegate them among the roads of the past. Political economists are proclaiming loudly that every impediment between the producer and the consumer should be removed, and some of them claim to have discovered impediments that are not visible to other eyes than their own; but it requires no study of political economy or mental philosophy to discover and fully comprehend the hills and hollows and mud in the time-killing, the property and life-destroying roads, over which the farmer is compelled to transport his products to market.

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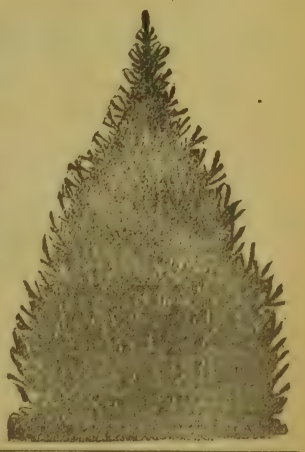
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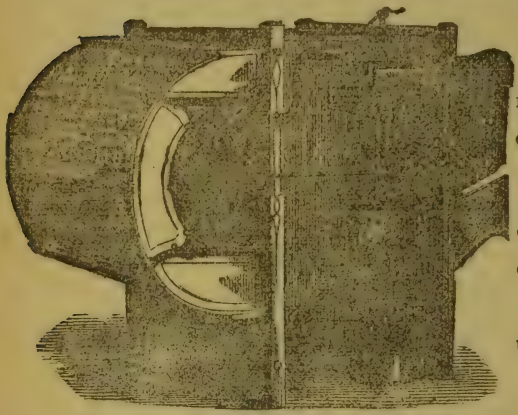
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### MARVIN 11359.

Record 2:28¼ at four years. By ELECTIONEER (79 in the 2:30 list); dam Bright Eyes (Sister to Prussian Boy, 2:26¼) By Gen. Benton (15 in 2:30 list); second dam Prussian Maid, 2:19¼, by Signal (4 in 2:30 list). $100 THE SEASON.

### ALENCON 9342.

Record 2:39¼. By LORD RUSSELL (brother to Maud S., 2:08¾, 6 in 2:30 list); dam Alice West record 2:26 (dam of Altumara, 2:30 at three years) by Almont (37 in 2:30 list). $100 THE SEASON.

### MANIPULATOR 9341.

Record 2:37 at four years By NUTWOOD, record 2:18¾ (sire 50 in 2:30 list); dam by Hetzel's Hambletonian (brother of Volunteer 55); second dam Julia B. (dam of Woodburn Pilot, 2:23¼ by Woodford Mambrino (12 in 2:30 list); third dam Bruna (dam of Romance dam of Farce, both in 2:30 list) by Pilot Jr. (sire of 9 in 2:30 list) by Pilot Jr. $50 THE SEASON,

### GOGEBIC 8556.

Record 2:42. By RED WILKES (50 in 2:30 list); dam by Brown Dick; second dam Kate Smith (dam of John R., 2:28) by Spalding's Abdallah. $50 THE SEASON.

### KING PIEDMONT 10938.

By PIEDMONT, 2:17¼ (sire of 9 in 2:30 list); 1st dam Daisy C (dam of Del-Paso 2:24.) By Electioneer (79 in 2:30 list); second dam Daisy D (dam of Millard 2:23): by the Moor (6 in 2:30 list); third dam Gray Dale (dam of Longworth, 2:19,) by American Boy. $50 THE SEASON.

### ELECTRIFICATION 10982.

By ELECTRICITY, record 2:17¾ (son of Electioneer, out of Midnight; dam of Jay-Eye-See, 2:10; Nootude 2:20¼); dam by Del Sur, record 2:24 (sire of 2 in 2:30 list); second dam by Clark Chief 89 (sire of 6 in 2:30 list). $50 THE SEASON.

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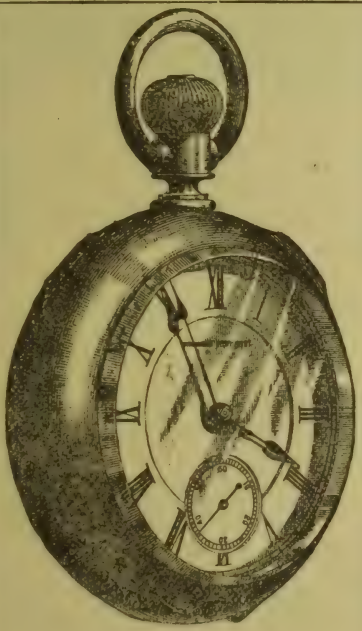
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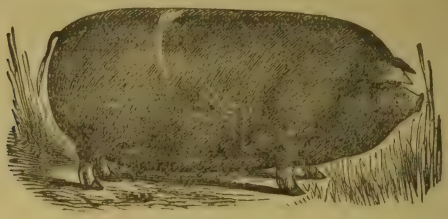
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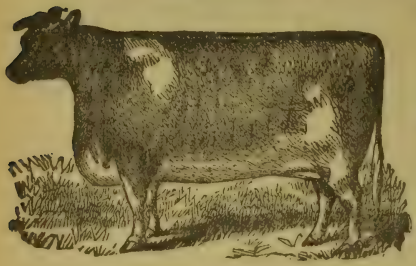
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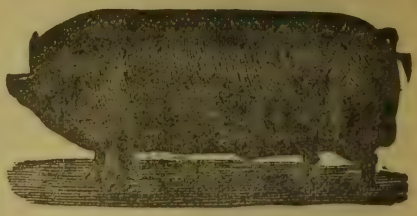
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## MILKING QUALITIES MADE A SPECIALTY

IN BREEDING SHORT-HORNS.

The Short-horn is standard for beauty and utility and the most valuable breed for the average farmer.

The Berkshire is also the standard hog, and weighs when mature, about 500 pounds, it furnishing, when ready for market, the best pork of all breeds, for the reason that the skin is thin, the bones firm and comparatively small, with more muscle or lean meat than any other breed. They mature early, are good mothers, prolific breeders, and when crossed on the large breeds produce best results.

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GALESVILLE, WIS.

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## STANDARD GRAIN MEASURE

Made of Japanned, or Galvanized Sheet Iron, with wood bottom.

BEST EVER MADE.

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Manufacturers. - Milwaukee, Wis.

# Beware of Cheap Imitations

At Risk of Quality of Your Butter.

## Has No Equal

**In Purity, Sweetness, Flavor, Strength, Uniformity of Grain, Keeping Quality, Perfect Dryness and**

## Cheapness.

**Salt is the Smallest item in the expense of a family and even the poorest people can afford to use the best.**




## Use Higgin's Eureka Salt,

In your dairy and household. For sale everywhere.

In the Annual Report of N. Y. State Dairymen's Association, the late Prof. L. B. Arnold says:

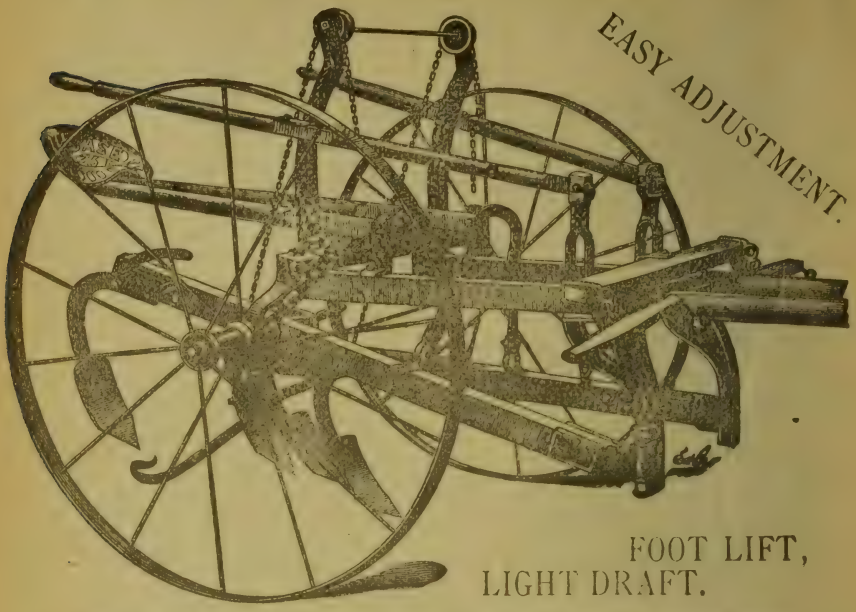
"After recently thoroughly examining the Higgin's Salt Works I became satisfied that the Eureka Salt is just what it is claimed to be, a very clean, pure and honestly made salt, uniform in quality, and in as good a condition for dairy purposes as any salt ever offered to the public."

Ask your dealer for Higgin's salt, and if he cannot supply you write us and we will see that you get it.

EUREKA SALT MFG. CO., LIMITED,

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# "OLD RELIABLE"




**Furnished with Four or Six Shovels, also Spring Teeth Gangs.**

# LEVER HARROWS




Made in Wood or Steel Frame.

**This illustration shows the** STEEL FRAME LEVER HARROW resting on the Shoes. **This device is** used only on the CASE. To appreciate it one should use the Harrow through a season and **they will** realize how much hard work it saves.

## SOME POINTS TO REMEMBER.

**The** Case Lever Harrows will pass over any obstruction, as all Cross Bars are on top; Levers **are** in center of Sections. Teeth can be adjusted to any angle by the Levers. Can not be **clogged,** as the Bars are free on the under side. Not even Washers on the Teeth to obstruct it. **It is** a labor-saving and time-saving implement, made entirely of Steel and Malleable Iron. **Can never** be worn out. It is finished and fitted so that it is an ornament to any farm. **If you buy one** you will never purchase another Harrow, as it will last as long as you live.

**If you buy the CASE, you will have the best.**

**Imitated by Many; Equalled by none.**

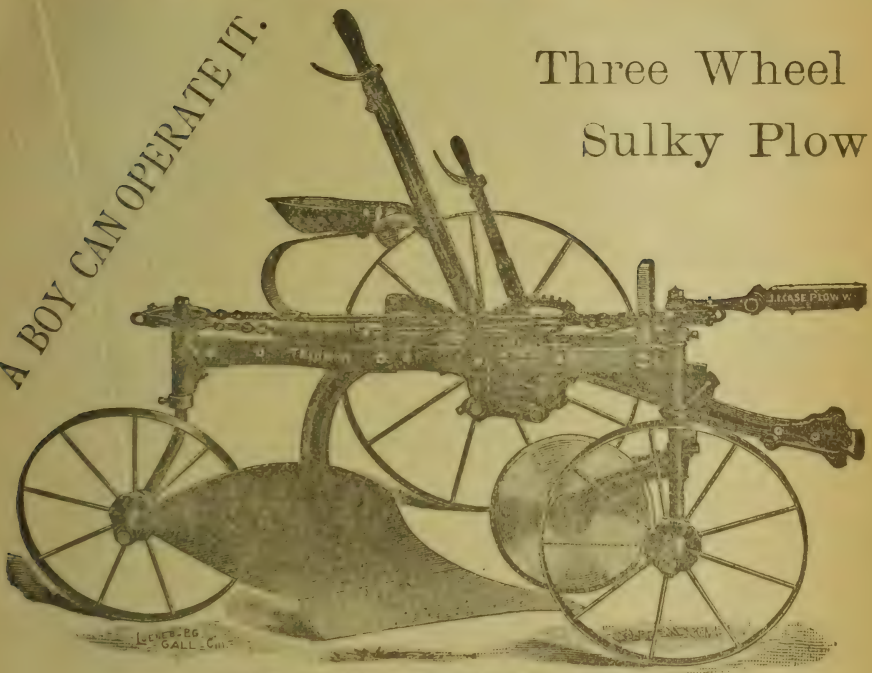
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Racine, Wisconsin.

# Triumph Conquers All.

A BOY CAN OPERATE IT.

Three Wheel
Sulky Plow




## READ WHAT THE FARMERS SAY.

*Hartley, Ia., June 9, 1891.*

J. I. CASE PLOW WORKS, Racine, Wis.

GENTLEMEN: — I Purchased of your agents Webster & Wesser of Hartley, Ia., one of the first Triumph Sulky Plows sold by them: have used it two seasons along side of the ——— *(we omit the name of our courtesy to our competitors, it is not our purpose to single out any one. We claim to triumph over all)* and are free to say that I know it to be far superior to it or any other sulky plow made for the following reasons: Because it draw lighter, will level from heel to point at any depth, handles easier, has more and better adjustment and in fact does the best work of any sulky plow made I remain,

Yours truly
H. M. SHIRK.

*Racine, Wis., June 17, 1891.*

J. I. CASE PLOW WORKS, RACINE, WIS.

The Triumph Sulky Plow I purchased of you last fall is giving me the best of satisfaction. I use two horses on it with a sixteen inch bottom, and to test the draft followed the sixteen inch Triumph with fifteen inch walking plow and each cutting and turning the same depth of furrow, the walking plow being one inch narrower cut. And am satisfied that the sulky drew fully as light as the walking plow, which as stated, was cutting one inch narrower, depth the same. And for ease of handling and adjustment is entirely satisfactory and can recommend it to any one as a plow that will give entire satisfaction. Yours truly,

WM. E. LEWIS,
Western Union Junction, Wis.

*Shamrock, Wis., May 27, 1891.*

MR. MILLS: *Dear Sir:*— [Extract.]

I have plowed on the marsh with the Triumph and it does good work, I have tried all walking plows but could do nothing with them. DAVID MANN.

TRY IT AND SEE FOR YOURSELF.

For Circular, address

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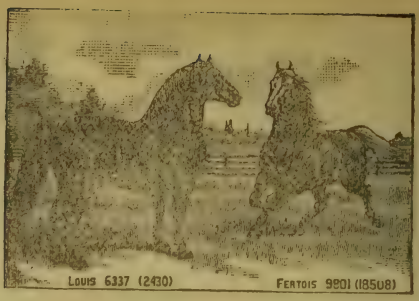
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The home of Louis, 6337, (2430), weight 2130 lbs. And Fertois, 9801, (18508), weight at 3y. 6mo., 2100, and many other good Stallions and Mares, Imported and home bread REGISTERED stock for sale at such prices as these:

Good young mares that have proved themselves good breeders and now in foal by Louis, for $450, weanlings, yearlings and 2 year fillies at corresponding low prices. Also choice young stallions from weanlings to fully matured at the very *lowest*. Come and examine my stock and I will make it to your interest. All stock guaranteed breeders. As I do my own importing in person and have no expensive agents to pay I will give my customers the benefit.

Send for catalogue to

H. A. BRIGGS,

Elkhorn, Walworth Co., Wis.

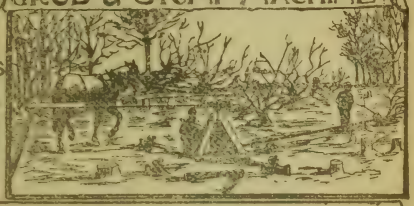
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GRUB OR STUMP.
A MAN, A BOY AND A HORSE CAN OPERATE IT.
NO HEAVY CHAINS OR RODS TO HANDLE.

THE NEW WAY WITH THE
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GRUB & STUMP MACHINE



THE CROP ON A FEW ACRES
THE FIRST YEAR WILL
PAY FOR THE MACHINE.
MAKES A CLEAN SWEEP OF TWO
ACRES AT A SITTING. WORKS ON
EITHER STANDING TIMBER OR STUMPS.

SEND POSTAL FOR ILLUSTRATED CATALOGUE.
JAMES MILNE & SON, SCOTCH GROVE, IOWA

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VERY HIGHLY ENDORSED
BY PROF. W. A. HENRY,
DIRECTOR OF EXPERIMENT
STATION UNIVERSITY OF
WISCONSIN, MADISON, WIS.



VERY HIGHLY ENDORSED
BY EX-GOV. W. D. HOARD,
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THE above cut illustrates a special scale we have designed for weighing milk in the pail, so as to determine the yield of each cow.

There is placed on the dial of this scale a loose indicator that can be adjusted and set by a thumb screw at the 0 mark, so as to balance the weight of the pail. This same indicator would thus show the net weight of the milk after milking. The capacity of this scale is 30 pounds; the face shows 10 pounds, and the pounds are divided by tenths, which makes it much easier to keep the records. With each scale we furnish free ten blanks, that will contain the record for two milkings a day for one week for fourteen cows.

The balances can be used for general purposes. PRICE, $5.00.

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—AND—

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ARE GROWN ON THE

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## SPARTA, WIS.




We cultivate and have for sale plants of the following varieties:

Britton and Snyder Blackberries
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Fay's Prolific, Victoria, Cherry, White Grape, La Versellare, Red Dutch, and Lee's Prolific, Black Currants, 1 and 2 yrs. old
Grapes—All the Leading Varieties

**We make a specialty of raising nice fruits and best hardy plants. All plants sold are carefully packed, and warranted true to name. Prices furnished on application. We are pleased at all times to answer questions by mail or otherwise, and cordially invite you to make a personal visit to our grounds. Let us hear from you.**

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Adaptation of the advantages of Centrifugal Separation to the means and requirements of the dairy farmer, thus ensuring him all the value that may be in his milk, and the ability to utilize it as may be most practicable.

10 to 30 per cent. increase in yield over any other system in use, with Separator Butter bringing the Best Prices on every market in the world—either fresh or kept.

Sweet Cream and Sweet skim milk—perfect Cleanliness and Purity, great saving of time, labor, ice and space.

Machines very simple, durable, compact, easily cleaned and very easily operated.

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**(WHAT PROF. HENRY SAYS OF THE "BABY" NO. 2.)**

University of Wisconsin, Agricultural Experiment Station,

MADISON, WIS., Aug. 8, 1891.

"We have been useing the "BABY" separator for some time past, and now regard it as a fixture in our dairy. As soon as three or four cows are milked the skimming begins and it is finished a few minutes after milking is over. We are skimming twice a day believing that to be the most economical way of conducting the work. The machine will skim 300 lbs. per hour down to one-tenth of one per cent. of butter fat left in the skim milk. We are greatly pleased with this separator. If is all you claim for it."

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**Style No. 1** (capacity 150 lbs.) **$100**

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## SATISFACTION GUARANTEED.

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GENESEE SALT COMPANY'S

# FACTORY FILLED SALT.

IN SPECIAL GRAINS

## FOR BUTTER AND CHEESE.

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**WHITE** **SWEET** **DRY**

**PURE** **CLEAN** **STRONG**

—AND—

FREE FROM PAN SCALE.

This Salt is made from a flow of clear Natural brine, and **not** from brine made by dissolving rock salt with surface water. It is used by a large portion of the best Creameries, Dairymen, and Cheese makers in America.

## GRAND SWEEPSTAKES

and all but one first and two second premiums, at the Minnesota State Fair, 1890. were salted with Genesee Salt. The first premium Creamery Butter, first premium Dairy Butter, first premium Cheese Minnesota, Dairymen's Association, at Glencoe, Minnesota December, 1890, salted with Genesee Salt. The Grand Sweepstakes at Nebraska State Fair, 1890, Wm. Sutton, Table Rock, Nebraska, salted with Genesee Salt. First premium at Iowa Dairymen's Association, Fort Dodge, November, 1890, Fort Dodge Creamery Association, salted with Genesee Salt. Grand Sweepstakes Creamery Butter, Illinois State Dairymen's Association, Ashley, Illinois, January, 1891, salt wtth Genesee Salt; also, first premium Dairy Butter, first premium Registered Stake, also salted with Genesee Salt.

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# READ! READ!! READ!!!

The information on this page is worth a $10 bill to every practical farmer. Read it through carefully. It won't take you over five minutes. Pretty good pay, you say, $2 a minute but it is a fact.

Every farmer has read of and many farmers throughout the entire country have used with great success the

## BREED WEEDER.

The subject of level and shallow cultivation of farm crops has been well written up during the last twelve months.

In nearly every article you will read, the Breed Weeder is conspicuously mentioned as the implement for this work.

The Rural New Yorker, Oct. 3rd, 1891 in answer to a correspondent says, "We think Breed's Weeder would prove as effective as any other ONE tool in killing small weeds."

It is the only tool necessary for the complete cultivation of all farm crops during the first month of their growth.

Read what noted farmers say regarding it.

"While one row of potatoes was being hoed by hand it being too near the edge to use the weeder, my son hoed with the weeder and one horse and more thoroughly THIRTY-SIX rows. I must have two next year."
T. B. TERRY.

"I regard Breed's Weeder as one of the most valuable implements a farmer can afford to employ."
J. J. THOMAS, Inventor of the Smoothing Harrow.

"We are using the weeder to-day on a field of potatoes a foot high and it does the best work it has done yet for we have hit just the right condition of the soil."
WALDO F. BROWN.

"Your weeder is about all that can be asked for as a weed killer and surface pulverizer."
JOHN GOULD.

"Its advantage is that it can comb out the fine weeds from the hills of corn and potatoes better than the harrow and later in the season and so fully supersede the hoe, doing better work than the hoe can and doing it ten times as fast. I predict that it will come into very wide general use among progressive farmers everywhere on decent soil."
W. I. CHAMBERLAIN, Formerly of the Iowa Agricultural College.

"I have only words of commendation for your weeder."
CHAS. W. BLEW, Manager of the Northwestern Agriculturist.

"I have just finished digging 2,600 bushels of potatoes from eight acres which was cultivated with the weeder. The weeds from the entire piece you could carry off in your coat pocket. So much for the weeder."
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Now what do you think of it? Don't you believe that you need one? Is it not better to let your horse do your hoeing if it can be done equally as well and ten times as rapidly? But don't stop here.

### READ THE FOLLOWING FACTS.

1st. This implement is a perfect weeder for all standard farm crops.

2nd. If your ground is in good condition it will do the entire work until the crop is a foot in height.

3rd. To get the best results the weeder must be used early and often, once at least before the crop is up. This is very important.

4th. It will save its cost, if properly used, every ten hours of its use.

5th. A cut worm can't live after a thorough use of the weeder.

6th. For putting in grain and grass seed and cultivating growing grains it is perfect. Experiments having shown that spring culture of winter wheat increased the product from 10 to 20 per cent. You think that these are pretty strong statements don't you but they are absolutely true and can be substantiated by the testimonials of hundreds of farmers.

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## LINE

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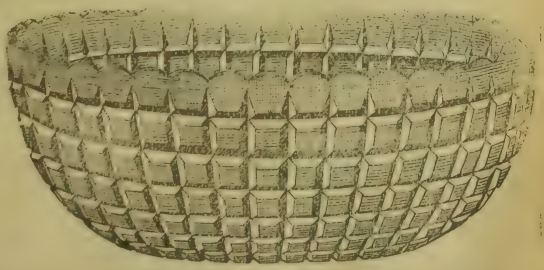
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In Purity, Strength, Evenness of Grain and Antiseptic Properties, Surpasses All Others




It is the Purest, Cleanest, Strongest, Cheapest and BEST DAIRY SALT IN the World.

At Wisconsin State Fair 1891, Butter Salted with **VACUUM PAN SALT** Scored 100 Points and was awarded First Premium in **EVERY CLASS.**

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At the Wisconsin State Dairymen's Association meeting at Berlin, Wis., 1891, Every First Premium was awarded to Butter Salted with **VACUUM PAN SALT.**

**USE IT AND MAKE FIRST PREMIUM BUTTER.**

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# People of Wisconsin

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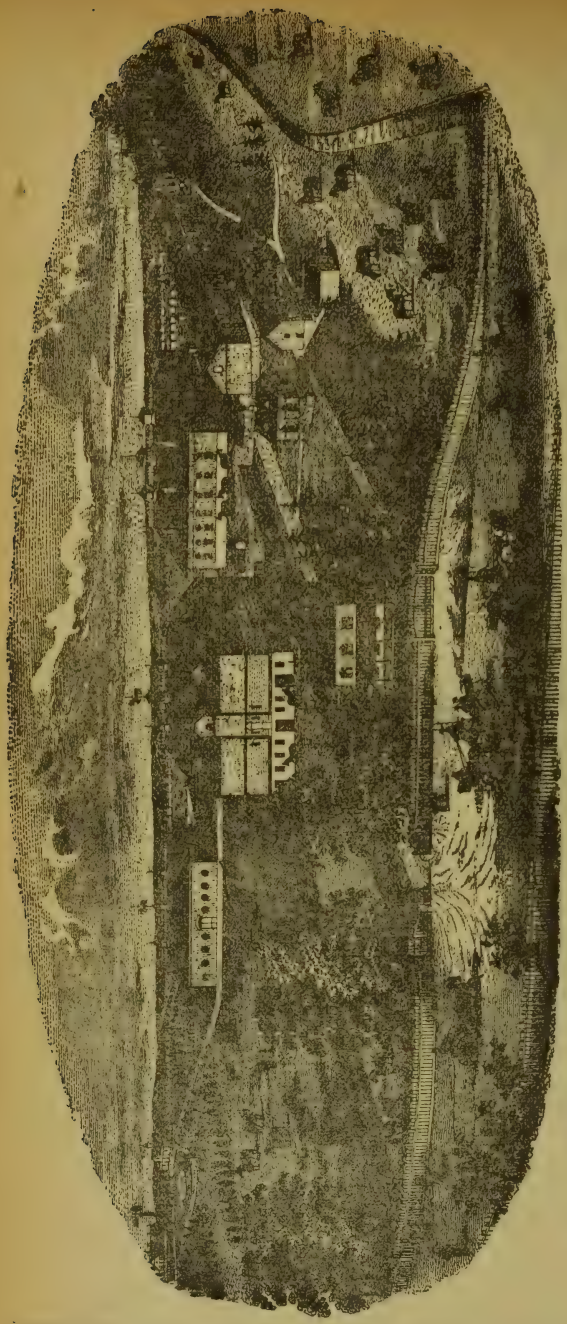
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Deep in Blood of Champion of America.

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**Dam Alpheous Belle, Today the best Butter Cow in the West, Record 5 1-2 lbs butter in 1 day, 33 1-2 lbs in 7 days.**

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## A BREEDER OF

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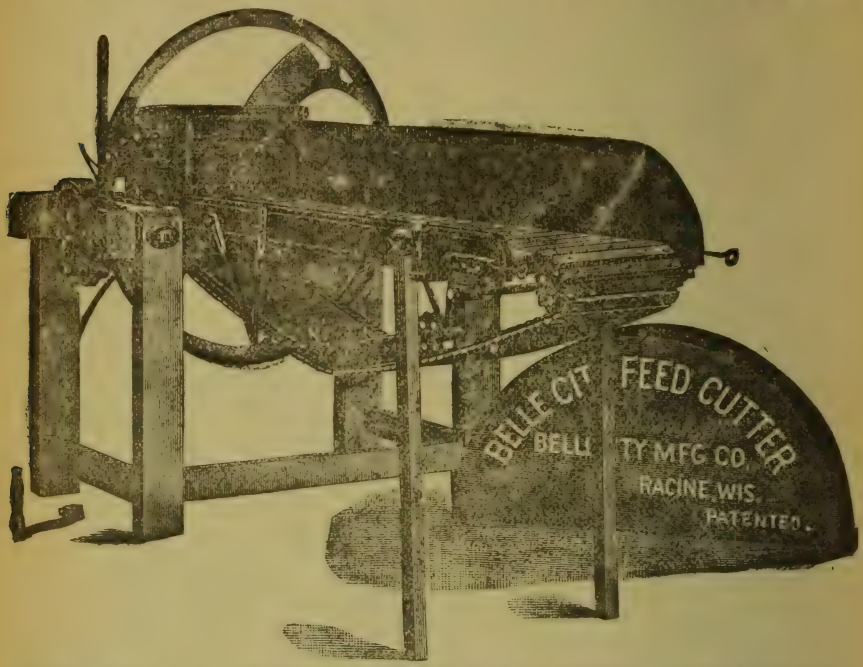
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I have been TWENTY-SEVEN years in the business of raising Merino sheep, and I have now 300 registered sheep of that breed for sale. I make a specialty of breeding sheep of large size, strong constitutions and with HEAVY FLEECES of FINE WHITE WOOL.

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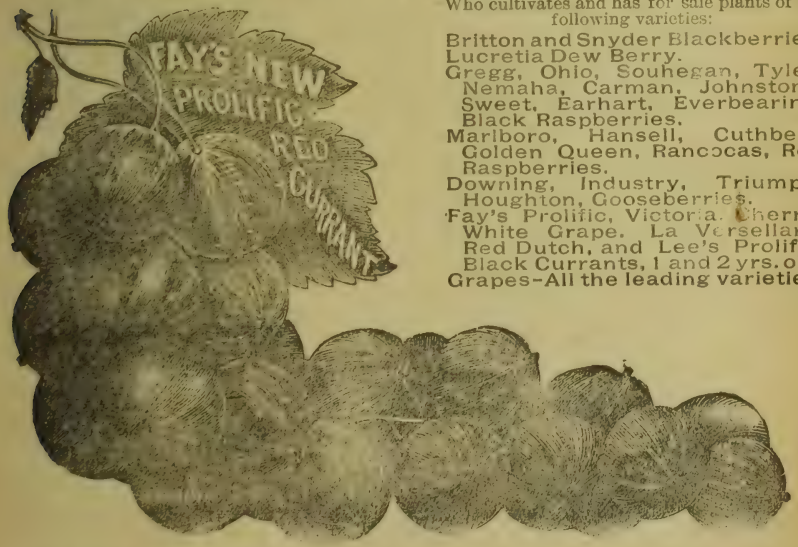
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Large Stock of First-Class Plants, and at reasonable prices. Correspond with me if you wish to plant and get prices. Yours truly,

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# HOLLOW BLUFF HERD

OF

# A. J. C. C. JERSEYS.

At the head of the herd is the bull RIOTER KEDIVE POGIS No 23132. One of the best bred bulls in the west. He is a grand-son of PRINCESS 2nd No. 8046, with a butter record of 46 lbs. 12oz. of butter in 7 days (official test) the largest weekly butter record of any cow living or dead, Princess 2nd is half sister to TORMENTOR No. 3533 the NOTED TENNESSEE bull who has a list of 28 daughters with weekly records from 14 to 27 pounds of butter each. Kedive is also a grand-son of BLACK PRINCE of LINDEN whose dam is a full sister to Stoke Pogis 3d. The best bull known to the Jersey world, having 27 daughters with records of 14 to 36 pounds butter in 7 days. On the dam side Kedive is a double great-grand-son of Stoke Pogis 3d. In every direction Rioter Kedive Pogis traces to some of the best blood known to the Jersey world.

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The mature cows of this herd are making from 400 to 500 pounds of butter each per year on good ordinary feed. No force tests have ever been made.

A few animals of both sexes always for sale.

**Prices Reasonable and Satisfaction Guaranteed.**

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## Blood of Pauline Paul De Kol 2d and Pietertje 2d?

We offer for sale a few young cows that have made large butter tests bred to their sons, young animals that represents a large per cent of their blood, and the FINEST COLLECTION of

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I offer to farmers wishing to get into the true dairy line at small expense, the increase of my herd of

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Calves of Both Sexes at Very Moderate Prices,

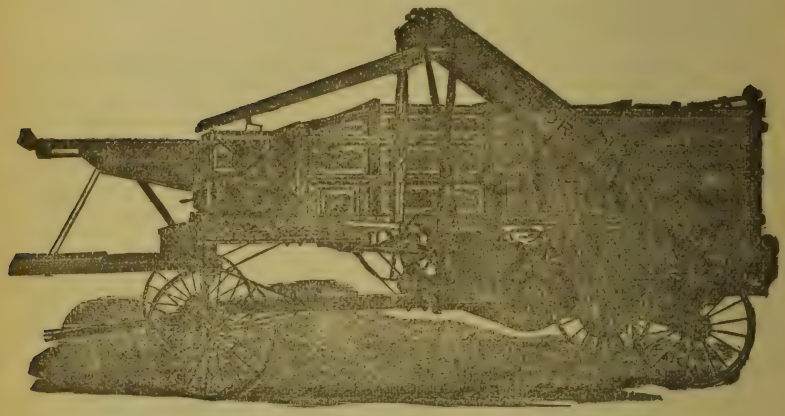
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20 TO 40 INCH CYLINDER.

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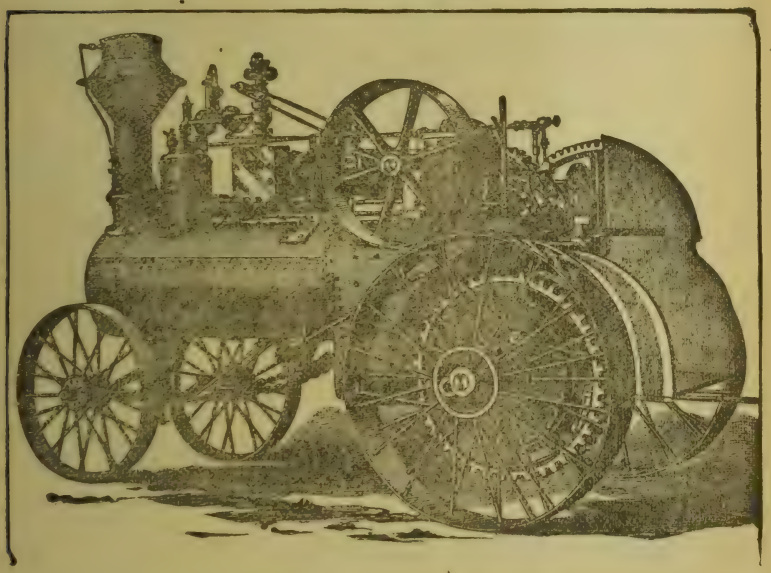
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**5,000 Northwest Greening,**

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*MANY WISCONSIN SEEDLINGS.*

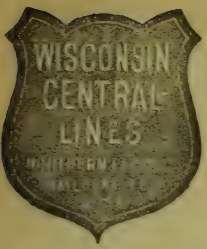
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**NO OLD BOX SEEDS.**

My Prices in Packet from 2 to 5 cents. In quantity as low as any Responsible House in America.

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Of all ages and sexes including many Prize Winners.

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Special Discounts to Clubs and Organizations.

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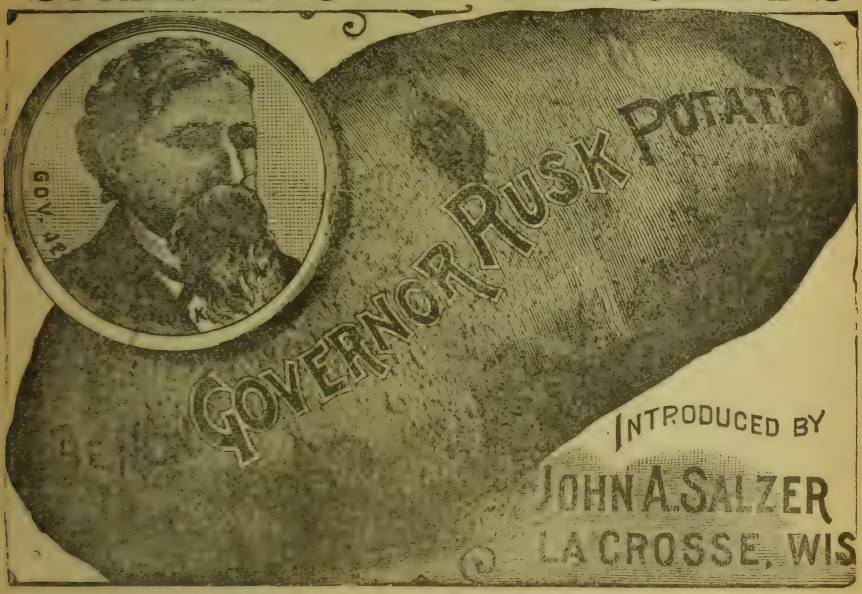
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## BREEDER OF POLAND CHINAS.

**All Breeders Recorded in O. P. C. R.**

**ALSO GROWER OF THE WONDERFUL PROBSTEIR BLUE RYE. SEND FOR PRICES WHICH YOU WILL FIND LOWER THAN ANYWHERE ELSE,**

Very truly yours,

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WAKEM & STONE, Proprietors, Madison, Wis.

Breeders of Short Horn Cattle, Roadster Horses, Cotswold Sheep, Poland China and Berkshire Swine. Prince Consort 5165 at the head of our flock of Cotswold Sheep, 20 young bucks, also a few choice young ewes and ewe lambs for sale cheap. Prince Consort was not beaten this year having won three first prizes, one diploma, and sweepstakes for best Long Wool Buck at La Crosse fair 1891.

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BERKSHIRES. Royalty, 24543 in use on a choice lot of sows—Our aim is to breed a smooth hog showing plenty of quality and an even distribution of fat and lean, Royalty and his get won at State Fair, 1891, first for Boar under six months, first for Sow Pig under six months, sweepstakes Boar Pig and first for Boar and his get, showing a very even breeder. We have Boars and Sows of each breed for sale, registered or eligible to registration.

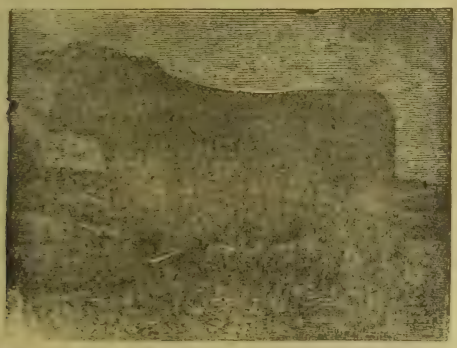
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MADISON, WIS.

# Spring Creek Stock Farm.



**WAKEM & STONE Proprietors, Madison, Wis.**

BREEDERS OF

## Short Horn Cattle, Roadster Horses,

## COTSWOLD SHEEP,

## Poland China and Berkshire Swine.

**SIR MOSS COOT 100869 at the Head of Herd of Short Horns.**

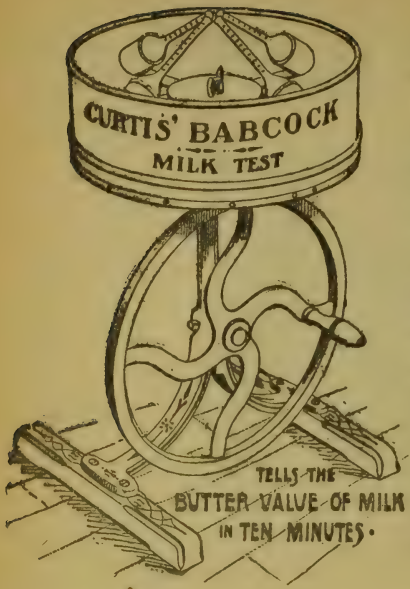
**Individual merit our Standard of Excellence.**

Our herd contains representatives of the following families: Princess, Roan Duchess, Adeliza, Young Mary, Nelly Bly, Desdemonia, Profitable and other useful families. Special attention given to the milking qualities in all purchases made for this herd. A small selection from our herd won nearly $700 at three fairs in 1891, including three grand sweepstakes and three diplomas. We have always for sale from 10 to 20 young bulls, at prices where the purchaser will receive good value for his money. Every male animal sold, guaranteed a breeder. Ample time given to responsible purchasers.

Send for Catalogue of Bulls, and come and see us and Receive a Square Deal.

## WAKEM & STONE,

## MADISON, WIS.




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Should have this machine, as it is intended especially for farm use, with a view to assist in weeding out the poor cows.

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Who keeps a half dozen cows ought to provide himself with one of our Babcock Testers, if he cares a snap of his finger to know whether he has a cow in his herd that is worth keeping. More than one cow "eats her head off" every year she is kept.

# How Many Cows do You Keep?

Are they three per cent. cows, or 5 per cent. cows? Figure the difference between the cow that gives an average of 20 lbs. of milk daily for 275 days, testing 4 per cent., and one giving the same amount testing 3 per cent.

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| 275 x 20=5,500 x 4.44=244.20 lbs. butter, at 25 cts. per lb., is | $61.05 |
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| Difference - 64.35 lbs. | $16.09 |

These are not extreme figures. There is not a dairy in the land that will not show wider extremes. One per cent. variation is a moderate yield for a single season, yet it means $16.09 in cash per cow.

Can you afford to keep cows and not have one of our Babcock Testers.

Send for circulars.

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Your name will not be mentioned unless you request it. If you are not satisfied that we will do as we say, you can write to the Wisconsin National Bank, of Watertown, Wis., for information. If it should so happen that the same name be received from more than one person, and a sale is made, then the prize will go to the one whose blank is received first. It is therefore best to fill up your blank and mail it promptly.

Our correspondents sometimes wonder how we can make this liberal offer and yet sell better horses and cheaper than our competitors. Our answer is that we simply spend the money this way instead of paying tens of thousands of dollars every year for newspaper advertising.

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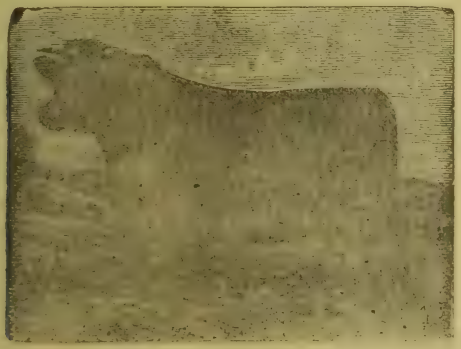
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We also breed Short-horn cattle, of the milking strains, and can furnish first-class bulls or heifers at reasonable prices.

We use a Cruickshank sire, thus combining beef and milk qualities.

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## ADAPTED AND ACCLIMATED.

Acclimation and Adaptation insures one half of a success, and good cultivation GAURANTEES the other half.

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**My prices are 25 to 50 per cent. lower than Eastern Stock---and your money will circulate at home.**

**I will teach you how to make Fruit Raising a success---come to my nurseries and see for yourselves.**

**Strawberry Plants for April and May Settings---Ancient Briton Blackberry Plants and Waupaca County Seedling Apple Trees a Specialty.**

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MANUFACTURERS OF——

**Feed and Ensilage Cutters and Carriers,**

FANNING MILLS,

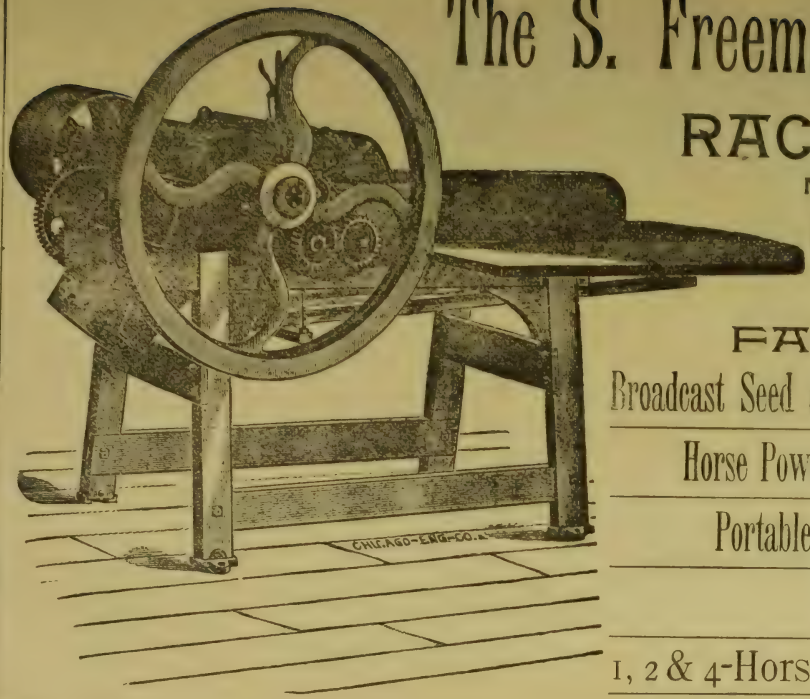
Broadcast Seed and Fertilizer Sowers, Sweep and Tread

Horse Powers, Corn and Feed Grinders, Upright

Portable Engines and Boilers, Swinging,

Sliding and Pole Saws,

1, 2 & 4-Horse Sweep Powers, FOR ALL KINDS OF FARM WORK.



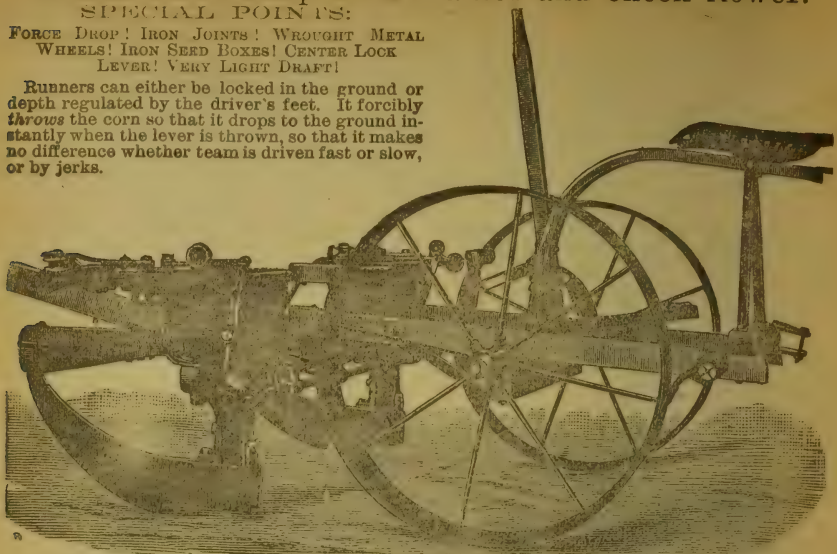

We want Live Implement Dealers in all unoccupied territory as agents. Every Farmer should Write for our Free Illustrated Catalogue and Treatise on Ensilage.

# Starks Force Drop Corn Planter and Check Rower.

SPECIAL POINTS:

FORCE DROP! IRON JOINTS! WROUGHT METAL WHEELS! IRON SEED BOXES! CENTER LOCK LEVER! VERY LIGHT DRAFT!

**Runners can either be locked in the ground or depth regulated by the driver's feet. It forcibly *throws* the corn so that it drops to the ground instantly when the lever is thrown, so that it makes no difference whether team is driven fast or slow, or by jerks.**



The above cut shows our Starks Force Drop Corn Planter with Improved Check Rower.

Will plant corn in straight rows both ways, whether team goes fast or slow. This alone will save the price of planter for every 100 acres of corn planted, by not having corn destroyed in cultivating.

When raised out of the ground it is self-locking, thus avoiding the use of latches.

It has glass at the heel of the drop so that the driver can at all times see the corn dropping.

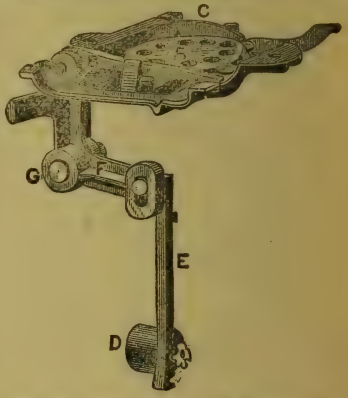
The lock being in the center, the runners go a uniform depth. Planters that lock at the side run deeper on one side than the other, when the planter is locked in the ground.

The runner can can be detached in a few moments by taking out two bolts, and can thus be readily sharpened.

In the joints on the frame is an iron plate with flanges which makes the frame perfectly rigid and exceedingly strong, and the water does not settle in the joint to rot the frame.

WE WILL, ON APPLICATION, send by mail a MODEL of the force drop, free of charge, to any person who contemplates buying a planter, so he can see just how the corn is dropped.

The accompanying cut shows the working parts of the Rotary Force Drop. The seed plate A is revolved by the pawl B and is locked by the latch C. The roller D receives the corn and is operated by the lever E, causing it to revolve and forcibly discharge the corn into the ground, overcoming any tendency of the corn to scatter as it drops, for the more rapidly the team moves, the more quickly corn is precipitated. The pawl A and the lever E are attached to the bell crank F, which oscillates on the pivot G and operates them both, and the noticeable feature in this device is the small number of working parts involved, which in consequence makes the force drop the most simple, durable, effective and complete dropping arrangement in the market. The corn is always dropped in check regardless of the speed of the team.




## CHECK ROWER.

SPECIAL POINTS.—Made entirely of Iron and Steel. No Wood Frame Across Planter. Great Strength, Easy Movement. Has Fewer Working Pieces than any other.

**DRILL ATTACHMENT.**—An attachment is used for planting the corn in drills, and when it is to be planted for ensilage, making it a perfect drill for this kind of work. Drop a postal for our calendar and account book.

*FULLER & JOHNSON MFG. CO., Madison, Wis.*

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